California Independent
System Operator Corporation

June 25, 2010

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. ER10-____-000

Tariff Amendment to Implement Convergence Bidding

Dear Secretary Bose:

The California Independent System Operator Corporation ("ISO") submits revisions to its tariff necessary to implement convergence bidding in the ISO's markets.[1] These tariff revisions are consistent with the ISO's convergence bidding design policy filing approved in principle, with certain modifications, in the Commission's February 18, 2010 order in Docket No. ER10-300-000.[2] The ISO requests that the Commission accept the proposed *pro forma* convergence bidding entity agreement included in this filing effective as of October 18, 2010, in order to permit the ISO and market participants that intend to take part in convergence bidding to execute convergence bidding entity agreements significantly in advance of the start of convergence bidding. The ISO also respectfully requests waiver of the Commission's regulations to permit the rest of the tariff revisions contained in this filing to become effective as of February 1, 2011, the date on which the Commission has authorized the ISO to implement convergence bidding.[3] Although it is requesting two different effective dates, the

[1] The ISO (which is sometimes also referred to as the CAISO) submits this filing pursuant to Section 205 of the Federal Power Act ("FPA"), 16 U.S.C. § 824d, and Section 35.13 of the Commission's regulations, 18 C.F.R. § 35.13. Capitalized terms not otherwise defined herein have the meanings set forth in Appendix A to the ISO tariff.

[2] *California Independent System Operator Corp.*, 130 FERC ¶ 61,122 (2009) ("Convergence Bidding Design Order"). This order acted on the ISO's convergence bidding design policy filing submitted to the Commission on November 20, 2009 ("Convergence Bidding Design Filing").

[3] Convergence Bidding Design Order at P 24.

ISO requests that the Commission address all aspects of this tariff amendment filing in a single order issued in advance of the requested October 18, 2010 effective date for the *pro forma* convergence bidding entity agreement.

Two extra copies of this filing are also enclosed. Please stamp these copies with the date and time filed and return them to the messenger.

I. Background

Convergence bidding is an important market enhancement that will enable market participants to hedge their physical market positions and manage their exposure to the differences between day-ahead and real-time prices. Virtual bids – also known as convergence bids – are bids to buy or sell electricity in the day-ahead market without any obligation to provide or consume electricity.[4] If these bids are cleared in the day-ahead market, they are automatically liquidated with the opposite buy/sell positions at real-time prices.

The history of the development of the ISO's convergence bidding proposal is discussed at length in the Convergence Bidding Design Filing and need not be repeated here.[5] Following an extensive stakeholder process, the ISO submitted the Convergence Bidding Design Filing to enable the Commission to provide guidance on the design elements of the convergence bidding proposal prior to the submission of detailed tariff provisions to implement the design following the tariff stakeholder process. In a separate motion, the ISO requested that the Commission authorize the ISO to implement convergence bidding by February 1, 2011.[6] In the Convergence Bidding Design Order, the Commission granted the ISO's requested implementation date, "approve[d] in principle the majority of the [ISO's] proposed convergence bidding features, and provide[d] guidance and [sought] additional details on other aspects of the proposal."[7] The Commission's directives and the ISO's responses to them are detailed in Section II of this transmittal letter, below.

The ISO, in the Convergence Bidding Design Filing, explained that it planned to conduct a robust stakeholder process to develop the tariff changes

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[4] The terms "convergence" and "virtual" are used interchangeably in this filing: "virtual" emphasizes the non-physical nature of the bids while "convergence" highlights one of the most significant expected benefits of this market feature – convergence of day-ahead and real-time prices.

[5] *See* Convergence Bidding Design Filing at 5-8.

[6] "Motion of the California Independent System Operator Corporation for Extension of Time to Implement Convergence Bidding," Docket Nos. ER06-615-000, *et al.* (Nov. 20, 2009).

[7] Convergence Bidding Design Order at PP 1, 24.

needed to implement convergence bidding.[8] Over a period of approximately five months, the ISO conducted three rounds of stakeholder review of the draft tariff language, each involving discussions with stakeholders and opportunities to submit written comments, resulting in iterative revisions to the tariff language based on the input provided by stakeholders and the ISO's own continuing review.[9] The ISO received valuable input from stakeholders in the tariff stakeholder process and would like to particularly recognize the contributions of Western Power Trading Forum, Southern California Edison Company, Pacific Gas & Electric Company, DC Energy, Dynegy and Powerex. The instant tariff amendment is the result of that extensive tariff language development process.

II. Proposed Tariff Changes

The ISO's proposed tariff changes to implement the Convergence Bidding Design Filing, as modified to reflect the direction provided in the Convergence Bidding Design Order and the convergence bidding stakeholder process, are set forth in this Section II of this transmittal letter. For ease of reference, the discussion below generally follows the subject headings and order of discussion provided in the Convergence Bidding Design Filing and the Convergence Bidding Design Order.

A. Basic Characteristics of Virtual Bids and Nodal Convergence Bidding

The ISO, in the Convergence Bidding Design Filing, explained the basic characteristics of virtual bids and stated that the ISO proposed to allow convergence bidding at a nodal level.[10] In the Convergence Bidding Design Order, the Commission authorized convergence bidding at a nodal level and accepted the basic characteristics of virtual bids as proposed by the ISO.[11]

In order to implement the characteristics of virtual bids and nodal convergence bidding, the ISO proposes to make the following tariff changes:

- Modification of the definitions of the terms "bid" and "energy bid" in Appendix A to include a "virtual bid."

- Addition to Appendix A of the term "convergence bidding entity."

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[8] Convergence Bidding Design Filing at P 5.

[9] A list of the key dates in the stakeholder process and electronic links to documents on the ISO's website regarding convergence bidding are provided in Attachment F to the instant filing.

[10] Convergence Bidding Design Filing at 8-12.

[11] Convergence Bidding Design Order at PP 35-37.

- Modification of the Appendix A definition of the term "market participant" to include a convergence bidding entity.

- Addition to Appendix A of the term virtual bid, meaning either a "virtual supply bid" or a "virtual demand bid." Both of these terms also are defined in Appendix A.

- Addition to Appendix A of the term "virtual award," meaning either a "virtual supply award" (*i.e.*, the cleared virtual supply bids in the IFM for a given hour) or a "virtual demand award" (*i.e.*, the cleared virtual demand bids in the IFM for a given hour).

- Revision of Section 30.2 of the ISO tariff to state that energy bids include virtual bids and to include other provisions regarding virtual bids.

- Addition of new Section 30.9 to the ISO tariff to include provisions on the characteristics of virtual bids. Section 30.9 states that virtual bids are energy bids that may be submitted only in the day-ahead market, at "Eligible PNodes" or "Eligible Aggregated PNodes."[12] For each scheduling coordinator identification code ("SCID") associated with a convergence bidding entity, there may be only one virtual supply bid and one virtual demand bid per each Eligible PNode or Eligible Aggregated PNode in the day-ahead market. The minimum size of a segment of a virtual bid is one MW.[13]

- Addition of new Section 30.9.1 to the ISO tariff to set forth the components of each virtual bid. These components include the "virtual bid curve," which the ISO proposes to define as the virtual bid component that indicates the prices and related quantities at which a virtual supply bid or a virtual demand bid is submitted. Section 30.9.1 states that virtual bids do not include start-up costs or minimum load costs.

- Addition of new Sections 30.7.3.6, 30.7.3.6.1, and 30.7.3.6.2 to the ISO tariff to state that, in addition to the day-ahead market validation rules described in existing Section 30.7.3.1 of the ISO tariff, virtual bids will be subject to two additional validation rules. First, the ISO will validate that the SCID associated with a virtual bid is submitted from a scheduling

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[12] The ISO proposes to define an Eligible PNode in Appendix A as a PNode located at an intertie where convergence bidding is permitted, or a PNode where either physical supply or demand is located and where convergence bidding is permitted. The ISO proposes to define an Eligible Aggregated PNode in Appendix A as an Aggregated PNode located at an intertie where convergence bidding is permitted, or an Aggregated PNode where either aggregated physical supply, a default LAP, or a trading hub are located and where convergence bidding is permitted.

[13] *See* Convergence Bidding Design Order at P 37 (approving proposal in the Convergence Bidding Design Filing that each convergence bid be a minimum of one MW).

coordinator authorized to submit virtual bids and that the virtual bid is submitted at an Eligible PNode or Eligible Aggregated PNode. The ISO will reject virtual bids that do not satisfy these requirements. Second, virtual bids must satisfy the credit requirements of Section 12.8 of the ISO tariff. The scheduling coordinator will be notified if virtual bids fail to satisfy the credit requirements. If the scheduling coordinator fails to resubmit bids that satisfy the credit requirements or provide adequate additional financial security, the ISO will reject the virtual bids on a last-in, first-out basis.[14]

- Revision of Section 31.2 of the ISO tariff to state that virtual bids are excluded from the market power mitigation and reliability requirement determination ("MPM-RRD") process.

- Modification of Sections 31.5.1.1 and 31.5.1.2 of the ISO tariff to state that virtual bids are not eligible to participate in the ISO's residual unit commitment ("RUC") process.

- Modification of Section 34.1 of the ISO tariff to state that virtual bids and virtual awards are not used in the real-time market.

- Revision of Section 37.3.1.1 of the ISO tariff to state that the provisions of that tariff section, which require market participants to submit feasible energy bids, RUC bids, ancillary service bids, and submissions to self-provide an ancillary service, do not apply to the submission of virtual bids.

B. Aggregation and De-aggregation of Virtual Bids in the ISO's Software

In the Convergence Bidding Design Filing, the ISO explained that the implementation of convergence bidding has the potential to increase the number of bids in the day-ahead market to a level that the ISO's day-ahead market software cannot handle. To address this issue, the ISO proposed to enhance the existing day-ahead market software to aggregate all of the virtual bids at each location (including each node, load aggregation point ("LAP"), and trading hub) to create one composite virtual bid curve for virtual supply and virtual demand, and

[14] The ISO's design specification for the convergence bid credit check software establishes an extremely high availability (99.999%). Accordingly, the ISO believes it is reasonable to allow bids to pass to the day-ahead market during brief periods when the credit check system is unavailable. As discussed in Section II.H, below, the ISO is also proposing tariff revisions giving the ISO authority to suspend virtual bidding in the event of a more extended outage of the credit check system.

later to de-aggregate the virtual bid results into individual cleared virtual bid results and publish them.[15]

The Commission, in the Convergence Bidding Design Order, agreed with certain commenters that the ISO's filing lacked certain details regarding the aggregation and de-aggregation of virtual bids that need to be explained and encouraged the ISO to work with stakeholders to provide additional details to market participants and the Commission regarding how the aggregation and de-aggregation of virtual bids at each location will work and to provide additional support for and explanation of its proposed rules for convergence bidding in its section 205 tariff filing.[16]

Khaled Abdul-Rahman, Principal, Power Systems Technology Architecture and Development for the ISO, provided details of the process for aggregating and de-aggregating virtual bids to market participants at the Market Performance and Planning Forum held on March 16, 2010.[17] The aggregation and de-aggregation of virtual bids is also addressed in the attached declaration of Khaled Abdul-Rahman, Principal, Power Systems Technology Architecture and Development for the ISO.[18] As Dr. Abdul-Rahman explains, the process for aggregating and de-aggregating virtual bids is simply an implementation detail that needs to be built into the ISO's automated market software in order to enable the market software to handle any large influx of virtual bids. After that feature is built into the market software, it will operate as follows. At the close of the day-ahead market (approximately 10:00 a.m.), the market software will aggregate the bid segments submitted by all of the scheduling coordinators at each location to create composite bid curves of virtual supply bids and virtual demand bids for use in the Integrated Forward Market ("IFM") optimization. The ISO will then conduct the day-ahead market processes (which are set forth in Section 31 of the ISO tariff) using physical bids and the aggregated virtual bids. After the market software determines the optimal solution and thus the cleared quantities at each location, the market software will de-aggregate the aggregated virtual bid results into individual cleared virtual bid results and will assign the virtual bid awards back to the correct scheduling coordinators. The ISO will then publish the day-ahead market results, including the virtual bid awards.[19]

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[15] Convergence Bidding Design Filing at 10.

[16] Convergence Bidding Design Order at P 38.

[17] *See Market Performance and Planning Forum* (Mar. 16, 2010), at slides 37-39. This presentation is available on the ISO's website at http://www.caiso.com/2756/27569a323ba80.pdf, and the relevant portions of the presentation are provided in Appendix 2 to Dr. Abdul-Rahman's declaration.

[18] Dr. Abdul-Rahman's declaration is provided as Attachment C to the instant filing.

[19] Declaration of Dr. Abdul-Rahman at 2-7.

The process for aggregating and de-aggregating virtual bids will have no impact on market participants. That is, this feature of the convergence bidding design does not impose any conditions on market participants and does not affect any rate or term. The aggregation and de-aggregation process will have no adverse effect on final virtual bids awards; market participants will receive the same final virtual bid awards they would have gotten if the process were not in effect (assuming that the ISO's market software were able to handle even an extremely large bid volume). This feature of the convergence bidding design simply preserves the ability of market participants to submit virtual bids without compromising the ISO's bidding infrastructure even if the bid volume becomes extremely large due to the introduction of convergence bidding. Accordingly, the details for aggregating and de-aggregating virtual bids need not be included in the ISO tariff.

C. Position Limits at Internal Nodes and Interties

The ISO, in the Convergence Bidding Design Filing, proposed to implement position limits on the megawatt volume of virtual bids that any one scheduling coordinator can submit at an individual node or intertie, in order to address the potential exercise of market power. The ISO proposed that one set of position limits will apply at internal nodes that would be gradually phased out over two years. The ISO proposed that a different set of position limits will apply at the interties to be phased out over three years.[20]

In the Convergence Bidding Design Order, the Commission noted that the ISO also proposed convergence bidding design features in addition to position limits to address market power issues.[21] The Commission found that, at the start of convergence bidding, employing a transitional "safety net" in addition to those other design features "may be appropriate to prevent unforeseen and unintended market outcomes that might come about because market participants lack experience in the new convergence bidding market," and that "this lack of experience could result in illiquidity at certain nodes at the outset of convergence bidding, which in turn could lead to distorted market outcomes."[22] In this regard,

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[20] Convergence Bidding Design Filing at 12-15, 19.

[21] The other convergence bidding design features the Commission discussed were the ISO's existing local market power mitigation procedures, the ISO's proposed congestion revenue right settlement rule, administrative fees applied to each submitted virtual bid or cleared virtual bid, tracking of market outcomes and responsive measures taken by market monitoring units, ISO authority to suspend convergence bidding, the ISO's fee structure, the ISO's credit requirements, and convergence bidding uplift costs. Convergence Bidding Design Order at PP 53-54. Most of these design features will be implemented through tariff changes discussed elsewhere in Section II of this transmittal letter.

[22] *Id.* at P 55.

the Commission explained that it "has found in other contexts that uncertainty at the start-up of a new market design justifies the implementation of interim measures to smooth the transition to a new market, so as to protect customers from unjust and unreasonable rates during the early stages of implementation."[23] The Commission stated that if the ISO wished to propose position limits at internal nodes as a transitional safety net in addition to its other design features for addressing market power issues, the ISO would need to provide the appropriate justification in its convergence bidding tariff amendment filing.[24] The Commission found that the ISO would need to provide similar justification for any proposal to implement position limits at the interties, including any justification for any differences between position limits at the interties and internal PNodes.[25]

The Commission found that the ISO had not demonstrated a need for a two-year phased implementation period at internal nodes or a three-year phased implementation period at the interties.[26] The Commission directed that, to the extent the ISO continues to find position limits appropriate, the ISO may propose a significantly shorter time period for those position limits.[27] The Commission noted that, in its order in another proceeding accepting the ISO's exceptional dispatch proposal, the Commission concluded that uncertainty associated with the new market justified interim measures during the initial months of the new market. The Commission stated that "similar interim measures" may be justified for convergence bidding position limits at internal nodes.[28] The Commission made similar findings as to convergence bidding position limits at the interties and stated that, "[i]f the CAISO believes that other issues at the interties (*e.g.*, impact on the RUC process or other reliability issues) justify longer and/or stricter position limits at the interties," the ISO should provide specific examples of the challenges presented and explain why other tools at the ISO's disposal will not adequately address the issues at the interties.[29]

As discussed below, the ISO continues to believe that position limits at both internal nodes and the interties are appropriate but is now proposing to shorten the period over which it will automatically phase out the position limits at

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23 *Id.* at P 56 (citing various Commission orders).

24 *Id.* at PP 55-56.

25 *Id.* at P 68.

26 *Id.* at PP 51-52, 66, 68.

27 *Id.* at PP 51, 66.

28 *Id.* at P 56.

29 *Id.* at P 68.

both the internal nodes and interties. Pursuant to the directives in the Convergence Bidding Design Order, the ISO proposes position limits at the internal nodes and interties that are approximately half the duration of the position limits proposed in the Convergence Bidding Design Filing. As explained below, requiring the ISO to phase out position limits sooner than this could result in adverse consequences before the ISO and market participants have sufficient experience with convergence bidding and the time to evaluate that experience.

1. Position Limits at the Internal Nodes and the Interties Are Appropriate

As further supported in the attached declaration of Margaret Miller, Manager, Market Design and Regulatory Policy for the ISO,[30] the ISO strongly supports the use of position limits at the internal nodes and interties during the initial implementation of convergence bidding even though other features of the ISO's convergence bidding design will contribute to addressing market power issues. The Commission has correctly recognized that it is appropriate to use position limits as a transitional safety net to mitigate the potential exercise of market power and other unjust and unreasonable market outcomes. The introduction of a major new market design feature frequently raises the possibility of unforeseen and unintended market outcomes. Therefore, it is prudent to employ position limits during the transition period while a more liquid and mature convergence bidding market develops and market participants and the ISO gain experience with the actual operation of convergence bidding. The ISO expects the convergence bidding market to mature quickly especially since convergence bidding has been active in the markets of other independent system operators ("ISOs") and regional transmission organizations ("RTOs") for a number of years. However, during the early stages of convergence bidding, the position limits will operate to ensure that no single market participant can exercise market power at an individual node and to prevent distorted market outcomes, thus protecting customers from unjust and unreasonable rates.

The ISO's concerns about the potential for a new element of the market to create opportunities for market manipulation and unjust and unreasonable rates are heightened by the experience of the ISO and its market participants during the Western energy crisis of 2000-2001. During that time, California and other portions of the West experienced market power issues and unanticipated market outcomes that had a far more dramatic impact on consumers than market issues that have been experienced in other regions of the United States. The effects of the Western energy crisis were so far-reaching that proceedings on them

[30] Declaration of Ms. Miller at 2-9. Ms. Miller's declaration is provided as Attachment D to the instant filing.

continue even today.[31] Given this historical context, the use of position limits in California as a transitional safety net is especially appropriate.

By limiting the megawatt volume of virtual bids that any one scheduling coordinator can submit at an individual node or intertie, the position limits will reduce the harmful effect that a market participant can have on the entire market. This will serve to prevent a variety of potentially manipulative behaviors. For example, the position limits will limit the ability of market participants to use virtual transactions to undermine the ISO's local market power mitigation measures, create infeasible schedules, or impact congestion for the purpose of gaming congestion revenue rights ("CRRs"). Therefore, the safety net created by the position limits will help to prevent various issues from arising.

The use of position limits is supported by both market monitors for the ISO. The ISO's Market Surveillance Committee ("MSC") originally suggested position limits as a design feature that would allow the ISO's convergence bidding design to include nodal convergence bidding.[32] Further, the MSC suggested that position limits be lifted as confidence in the virtual market increases. The ISO's Department of Market Monitoring ("DMM") also recommended the use of position limits.[33]

The ISO proposes to implement the position limits at the internal nodes and interties by adding new Section 30.7.3.6.3 to its tariff. The provisions of Section 30.7.3.6.3 are consistent with the design components set forth in the Convergence Bidding Design Filing.[34]

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[31] *See generally* Docket Nos. EL00-95, *et al.*

[32] Although the ISO's decision to propose virtual bidding at the nodal level has been well settled for quite some time, it was the introduction of the concept of position limits that bridged the gap between stakeholders that advocated zonal convergence bidding and those that advocated nodal convergence bidding.

[33] *See* MSC "Options for the Conceptual Design for Convergence Bidding," at 8-9 (Aug. 7, 2007), available on the ISO's website at http://www.caiso.com/1c33/1c33db5932960.pdf; "Convergence Bidding: Department of Market Monitoring Recommendations," at 8-9 (Nov. 2007), available on the ISO's website at http://www.caiso.com/1c8f/1c8ff5f46c90.pdf; DMM "Comments on Straw Proposal for the Design of Convergence Bidding," at 2 (July 24, 2009), available on the ISO's website at http://www.caiso.com/23f8/23f8a5a465aa0.pdf; MSC "Final Opinion on Convergence Bidding," at 2-3 (Oct. 19, 2009), available on the ISO's website at http://www.caiso.com/244f/244f94572c920.pdf; Memorandum from Eric Hildebrandt, Interim Director, Market Monitoring, to ISO Governing Board re Market Monitoring Report, at 3-4 (Oct. 21, 2009), available on the ISO's website at http://www.caiso.com/244f/244f99f1605d0.pdf.

[34] *See* Convergence Bidding Design Filing at 13-14, 19.

2. The ISO's Revised Position Limits at the Internal Nodes and Interties is Appropriate

The ISO proposes position limits at internal nodes that will be automatically phased out over the course of one year. Consistent with the directives in the Convergence Bidding Design Order, this is a significantly shorter time period than the ISO initially proposed – it is half the length of the phase-out period proposed in the Convergence Bidding Design Filing. Although the Convergence Bidding Design Order cited the four-month implementation period for interim measures approved in the exceptional dispatch proceeding as an example of an appropriate interim period, the Convergence Bidding Design Order did not state that four months was the *only* appropriate time period for position limits in this convergence bidding proceeding. In fact, the ISO believes that position limits must remain in effect for longer than four months if they are to serve their intended purpose. The ISO will not have a significant amount of data to evaluate the potential market impacts of convergence bidding at internal nodes after only four months of operation of the convergence bidding market. The ISO will need sufficient data and time to analyze the data before the position limits can be lifted. Further, because the ISO plans to implement convergence bidding on February 1, 2011, a four-month implementation period for position limits would expire on June 1, 2011, which would be near the start of the first summer season of convergence bidding, when the potential for adverse market impacts associated with convergence bidding could affect the ability of the ISO to rely upon market mechanisms to satisfy peak load. For these reasons, the Commission should authorize the ISO to phase out the position limits at internal nodes over the course of a year.

Proposed new Section 30.7.3.6.3.1 sets forth the phased-out implementation period for position limits at internal nodes. The percentages set forth in Section 30.7.3.6.1 for calculating position limits are as follows:

- Position limits of 10 percent of the PMax of physical supply resources and forecasts of the maximum MW consumption of physical demand resources at the internal nodes will apply for the first eight months after the implementation of convergence bidding.

- Position limits of 50 percent of the PMax of physical supply resources and forecasts of the maximum MW consumption of physical demand resources at the internal nodes will apply for the ninth month through the twelfth month after the implementation of convergence bidding.

- No position limits will apply starting in the thirteenth month after the implementation of convergence bidding.

The ISO proposes position limits at the interties that will be automatically phased out over the course of one and a half years. As with internal nodes, the ISO has cut the proposed phase-out period in half. The Commission should authorize the ISO to implement its proposed phase-out of position limits at the interties not only for the reasons discussed above for internal nodes but also because, as discussed below, convergence bidding at the interties has the potential to present certain problems that do not apply to convergence bidding at internal nodes.

A longer phase out of position limits at the interties is justified for a number of reasons. First, the values of the operating transfer capabilities at the interties are usually significantly larger than the values of the PMaxes of physical supply resources and forecasts of the maximum MW consumption of physical demand resources at the internal nodes. Even with the smaller percentage position limits in place at the interties, a market participant can still take a sizeable position at many of the scheduling points due to the higher MW limit. This means that the smaller percentages and longer phase out is less onerous for market participants. Given the large value of operating transfer capabilities at the interties, the ISO believes that the safety net for the interties must be significantly tighter, at least at first. Taking that approach will narrow the gap between how much virtual transactions are reduced at the interties due to the application of position limits and how much virtual transactions are reduced at the internal nodes due to the application of position limits. Appropriately tailored position limits on the interties will allow the ISO to monitor the potential effect that excess volumes of virtual bids on the interties could have on reliability and the ISO's ability to rely on the interties for physical imports and exports during the initial period of convergence bidding implementation.

Applying more stringent position limits at the interties is justified by reliability considerations, because the interties present greater reliability concerns than do internal nodes. The ISO depends on imports at the interties to meet approximately 20 percent of the ISO's supply needs. However, when convergence bidding is implemented, virtual imports could potentially crowd out a significant amount of physical imports in the IFM – particularly non-resource adequacy imports – leaving the ISO short of normal import supplies and dependent on the hour-ahead scheduling process ("HASP") to fill the gap.[35] Smaller position limits will allow the ISO to monitor the volumes and effects of virtual bidding on the interties and to mitigate these potential reliability concerns.

Moreover, the RUC process cannot be used to effectively address this issue, for two reasons. First, as a capacity procurement mechanism, RUC does not procure energy (beyond the minimum load energy of generators it commits).

[35] The hour-ahead scheduling process occurs during the real-time time frame. ISO tariff, Section 33.

Thus, when RUC procures imports, it essentially procures an obligation for those imports to bid energy into the HASP. But RUC does not reserve transmission capacity for those imports, and because the RUC process does not award energy schedules to resources, the import suppliers may not reserve external transmission to deliver energy to the ISO in order to respond to a HASP schedule. RUC was simply not designed to procure energy from imports if those imports do not clear the IFM. The import supplies that currently can participate in RUC are those that provide resource adequacy capacity. Although the discussion above also applies to some extent to resource adequacy imports, an important distinction is that import suppliers of resource adequacy capacity are expected to manage their RUC participation obligations so as to ensure their ability to deliver in the HASP if they are given a RUC schedule. The ISO has explored options for opening up RUC participation to include non-resource adequacy imports, but for the reasons discussed above this change in itself may not be sufficient to guarantee the availability of non-resource adequacy imports in the HASP if they do not have an IFM energy schedule.

Given these considerations, it is necessary and appropriate to apply more stringent position limits at the interties than apply at internal nodes. For the same reasons, it is also appropriate to phase out position limits on the interties over a longer period of time compared to the phase-out period at internal nodes. Proposed new Section 30.7.3.6.3.2 sets forth the following phased-out implementation period for position limits at the interties:

- Position limits of 5 percent will apply for the first eight months after the implementation of convergence bidding.

- Position limits of 25 percent will apply for the ninth month through the twelfth month after the implementation of convergence bidding.

- Position limits of 50 percent will apply for the thirteenth through the sixteenth month after the implementation of convergence bidding.

- No position limits will apply starting in the seventeenth month after the implementation of convergence bidding.

D. Other Elements of the ISO's Filing Addressing Convergence Bidding at the Interties

1. Measures to Address Intertie Scheduling Practices

In the Convergence Bidding Design Filing, the ISO explained that allowing convergence bidding at the interties between the ISO balancing authority area and other balancing authority areas will mitigate the potential for reliability and operational difficulties created by implicit convergence bidding (*e.g.*, scheduling

physical bids in the day-ahead market with no intention of physically delivering on the schedule, for the purpose of liquidating the schedule in the HASP). The ISO explained that implicit convergence bidding on the interties is possible because resources associated with intertie energy bids will not be identified until intertie schedules are tagged and a resource in a neighboring balancing authority area is designated as providing energy for an intertie schedule.[36] Moreover, in the October 2, 2009 "Addendum to the Draft Final Proposal for the Design of Convergence Bidding" ("Addendum") discussed in the Convergence Bidding Design Filing, the ISO stated that it was considering the development of a mechanism to deter such implicit virtual bidding at interties.[37] In the Convergence Bidding Design Order, the Commission agreed with the ISO that convergence bidding should be permitted at the interties.[38]

The ISO now proposes to add new Section 11.32 to its tariff in order to deter implicit convergence bidding. Section 11.32 states that the ISO will take the following actions regarding schedules that clear the day-ahead market at the interties which are wholly or partially reversed in the HASP:

(i) The ISO will charge the scheduling coordinator the positive difference between the day-ahead market price and the HASP price applicable to any imports that clear the day-ahead market and are reduced in the HASP for which the scheduling coordinator has failed to submit an E-Tag or E-Tags consistent with the scheduling coordinator's day-ahead schedule and WECC scheduling criteria.

(ii) The ISO will charge the scheduling coordinator the positive difference between the HASP price and the day-ahead market price applicable to any exports that clear the day-ahead market and are reduced in the HASP for which the scheduling coordinator has failed to submit an E-Tag or E-Tags consistent with the scheduling coordinator's day-ahead schedule and WECC scheduling criteria.

(iii) The ISO will treat any reduction by a scheduling coordinator to a day-ahead import or export schedule in the HASP as a virtual award for purposes of adjusting CRR revenue pursuant to

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[36] Convergence Bidding Design Filing at 15.

[37] Addendum at 11. The Addendum is available on the ISO's website at http://www.caiso.com/279d/279dd7165a8f0.doc. As explained in that document, the Addendum was updated on May 20, 2010 to reflect corrections in the ISO's bid cost recovery equations.

[38] Convergence Bidding Design Order at P 66.

Section 11.2.4.6 of the ISO tariff if the scheduling coordinator submits schedules on behalf of or is a CRR holder.[39]

(iv) For any import schedule that clears the day-ahead market which a scheduling coordinator reduces in the HASP, such reduced quantities will be subject to the allocation of net real-time market bid cost uplift as set forth in Section 11.8.6.6 of the ISO tariff.

The ISO also proposes to revise Section 11.8.6.6 of the ISO tariff to state that, for scheduling coordinators of MSS operators that have elected to follow their load, the real-time market bid cost uplift will be allocated in proportion to their MSS net negative uninstructed deviation plus any HASP reductions not associated with existing transmission contracts ("ETCs"), transmission ownership rights ("TORs"), or converted rights.

These provisions in Section 11.32 and 11.8.6.6 will provide market participants with an appropriate economic signal to declare virtual bids under convergence bidding.[40] The provisions eliminate financial advantages that scheduling coordinators could gain from an implicit convergence bidding strategy. The ISO discussed the provisions with market participants in a stakeholder process separate from the convergence bidding stakeholder process.[41] The ISO obtained approval from the ISO Governing Board in February 2010 to implement these provisions through a tariff amendment to go into effect at the time the ISO implements convergence bidding.[42] During the ISO's stakeholder process, market participants argued that they may incur higher transmission costs by having to secure transmission well in advance of an operating hour in order to minimize exposure to the HASP reversal settlement rule for imports and exports described above. The ISO's proposal, however, allows market participants significant flexibility for when they procure their transmission. But scheduling coordinators must submit an E-tag consistent with

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[39] The adjustment of CRR revenue pursuant to Section 11.2.4.6 of the ISO tariff is discussed in Section II.E.1 of this transmittal letter.

[40] The provisions of Section 11.32 will not apply to schedules that clear the day-ahead market at the interties and that a scheduling coordinator wholly or partially reverses in the HASP to the extent that such schedules are balanced ETC self-schedules, balanced TOR self-schedules, or balanced converted rights self-schedules. The reason for this exemption is that there is no potential for reliability and operational difficulties resulting from such self-schedules.

[41] Materials prepared by the ISO and market participants in the separate stakeholder process are available on the ISO's website at http://www.caiso.com/244c/244cabfb36550.html.

[42] *See* Memorandum from Keith Casey, Vice President, Market & Infrastructure Development to ISO Governing Board Regarding "Decision on E-tag Timing Requirements Initiative" (Feb. 3, 2010). This Memorandum is available on the ISO's website at http://www.caiso.com/2733/2733935d539a0.pdf.

WECC's scheduling criteria. This constitutes a reasonable balance between stakeholder concerns and the need to ensure the legitimacy of physical intertie schedules prior to real-time operations. Other stakeholders recommended that the ISO implement its proposed tariff changes, specifically the HASP reversal settlement rule, immediately as opposed to concurrently with convergence bidding. The ISO believes, however, that implementation of these new rules concurrently with convergence bidding is more appropriate because it allows sufficient time for the ISO and market participants to make any necessary system changes.

2. Addition of Constraints Within the ISO's Market Software for Intertie Scheduling

In the Convergence Bidding Design Filing, the ISO explained that it will enforce two constraints (a physical constraint and also a physical and virtual constraint) within its market software in the day-ahead market for each intertie scheduling point after convergence bidding goes into effect.[43] The Commission approved the ISO's proposal to enforce additional constraints within its market software to address the reliability challenges facing the ISO in implementing convergence bidding at the interties. The Commission found the ISO's enforcement of two sets of constraints on intertie schedules in the day-ahead market (one for physical exports and imports and another for the sum of the physical and virtual import and export schedules) to be a reasonable approach to meeting the applicable NERC and WECC reliability standards.[44]

The ISO proposes to add new Section 31.8 to its tariff to set forth the ISO's use of these two constraints. Section 31.8 states that the ISO will apply the two constraints unless the bidding prohibition set forth in Section 30.8 of the ISO tariff applies.[45]

E. Tariff Revisions to Address the Potential for Market Power and Market Manipulation

In the Convergence Bidding Design Filing, the ISO acknowledged that the implementation of convergence bidding may increase opportunities for market participants to exercise market power or engage in market manipulation. The ISO explained that the convergence bidding design includes a number of elements that reduce the potential for market participants to exploit market power

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[43] Convergence Bidding Design Filing at 15-18.

[44] Convergence Bidding Design Order at PP 66-67.

[45] Section 30.8 prohibits bidding across out-of-service transmission paths at scheduling points. The ISO also proposes to modify Section 30.8 to specify that the prohibition applies to virtual bids.

or manipulate market outcomes. These elements include: position limits at internal nodes and interties; retaining the ISO's existing local market power mitigation procedures that utilize forecast demand after convergence bidding goes into effect; a CRR settlement rule to address the potential for market manipulation using CRRs; the ability to suspend convergence bidding; and measures to monitor for and address market manipulation related to scheduling incentives under "seller's choice" contracts.[46]

The Commission found that the ISO proposed "adequate market mitigation measures and safeguards that are designed to prevent manipulation of markets through the use of convergence bidding."[47] The Commission also found that, subject to modifications required by the Convergence Bidding Design Order, the ISO's market mitigation measures "may be acceptable as proposed" and are "consistent with prior Commission directives as well as mitigation practices developed in similar markets."[48]

The only market mitigation measures that require revisions to the ISO tariff are position limits at internal nodes and interties, the CRR settlement rule, and the ability to suspend convergence bidding. The position limits are discussed above in Section II.C of this transmittal letter. The CRR settlement rule and the ability to suspend or limit convergence bidding are discussed below.

1. CRR Settlement Rule

In the Convergence Bidding Design Filing, the ISO explained that a well-documented market manipulation concern is that virtual bids can be used to alter the value of CRRs (or similar financial transmission rights), and that other ISOs and RTOs have addressed this concern through the application of their CRR settlement rules. For similar reasons, the ISO proposed to include in its tariff an automated settlement rule (similar to an existing practice of PJM Interconnection, L.L.C. ("PJM")) as part of the market design of convergence bidding. The ISO stated that its settlement rule would adjust the revenue from CRRs in the event that a convergence bidding entity that is also a CRR holder engages in convergence bidding behavior that may impact the value of its CRRs in the day-ahead market.[49]

The Commission found that, consistent with practices in similar ISO and RTO markets with convergence bidding, the ISO's proposed CRR settlement rule

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[46] Convergence Bidding Design Filing at 19-24.

[47] Convergence Bidding Design Order at P 36.

[48] *Id.* at P 85.

[49] Convergence Bidding Design Filing at 21.

is "a reasonable mechanism to mitigate convergence bidding that is intended to alter the value of congestion revenue rights." The Commission stated that it expected the ISO to file tariff provisions that clearly and objectively describe the instances that warrant mitigation. This includes a description of what constitutes a significant impact under step two of the CRR settlement rule and the provision of the actual measures to be used.[50]

Consistent with the Commission's directives, the ISO proposes to add new Section 11.2.4.6 to its tariff to include the CRR settlement rule. Section 11.2.4.6 provides that the ISO will adjust the revenue from the CRRs of a CRR holder that is also a convergence bidding entity, and will adjust the revenue from the CRRs of a CRR holder (regardless of whether the CRR holder is also a convergence bidding entity) where the scheduling coordinator representing that CRR holder has reduced a day-ahead import or export schedule in the HASP as set forth in Section 11.32 of the ISO tariff,[51] whenever the convergence bidding activity on behalf of that entity or a reduction to a day-ahead import or export schedule in the HASP has had a significant impact on the value of the CRRs in the day-ahead market as determined in accordance with the following four steps:

(1) For purposes of Section 11.2.4.6 and the definition of a flow impact,[52] any reduction by a scheduling coordinator submitting schedules on behalf of an entity that is a CRR holder to an import or export schedule in the HASP will be treated as a virtual award. For each CRR holder, for each hour, and for each constraint binding in the IFM, HASP, or real-time dispatch, the ISO will calculate the flow impact of the virtual awards awarded to the scheduling coordinator that represents the CRR holder, excluding virtual awards at LAPs and generation trading hubs.

(2) The ISO will determine the peak and off-peak hours of the day in which congestion on the constraint was significantly impacted by the virtual awards that were awarded to the scheduling coordinator representing the CRR holder. Congestion on the constraint will be deemed to have been significantly impacted by the virtual awards that were awarded to the scheduling coordinator that represents the CRR holder if the flow impact passes two criteria. First, the flow impact must be in the direction to increase the value of the CRR holder's CRR portfolio. Second, the flow impact must exceed the

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[50] Convergence Bidding Design Order at P 87.

[51] Section 11.32 is discussed above in Section II.D.1 of the transmittal letter.

[52] The proposed new definition of a "flow impact" is discussed below in this Section II.E.1 of the transmittal letter.

configurable threshold percentage of the flow limit for the constraint. The threshold percentage will initially be set at 10 percent of the flow limit for each constraint. The threshold percentage may be changed as provided in the applicable Business Practice Manual ("BPM"). An increase in the threshold percentage for any constraint must be based on evidence (from simulations of market re-runs or other appropriate analytical tool) that a flow impact greater than the current threshold percentage should not be expected to have a significant impact on the constraint's shadow price. A decrease in the threshold percentage for any constraint must be based on evidence (from simulations of market re-runs or other appropriate analytical tool) that a flow impact less than the current threshold percentage should be expected to have a significant impact on the constraint's shadow price. The DMM will notify the Commission of a change in any constraint's threshold percentage on a quarterly basis in the event that a change occurs.[53]

(3) For each peak or off-peak hour that passes both criteria in step (2), the ISO will compare the constraint's impact on the day-ahead market value of the CRR holder's CRR portfolio with the constraint's impact on the HASP or real-time market value of the CRR holder's CRR portfolio, as applicable.

(4) The ISO will adjust the peak or off-peak period revenue from the CRR holder's CRRs in the event that, over the peak or off-peak period of a day, the constraint's contribution to the day-ahead market value of the CRR holder's CRR portfolio exceeds the constraint's contribution to the HASP or real-time market value of the CRR holder's CRR portfolio, as applicable. The amount of the peak period adjustment will be the amount by which the constraint's contribution to the day-ahead market value of the CRR holder's CRR portfolio exceeds the constraint's contribution to the HASP or real-time market value of the CRR holder's CRR portfolio for the peak-period hours that passed both criteria in step (2), as applicable. The amount of the off-peak period adjustment will be the amount by which the constraint's contribution to the day-ahead market value of the CRR holder's CRR portfolio exceeds the constraint's contribution to the HASP or real-time market value of the CRR holder's CRR portfolio for the off-peak period hours that passed both criteria in step (2), as applicable.

[53] In the event of a change in any constraint's threshold percentage, the ISO will also notify market participants of the change through a market notice, pursuant to a process to be included in a Business Practice Manual.

In connection with these tariff revisions, the ISO also proposes to add to Appendix A of the ISO tariff the new term "flow impact," defined as the combined impact of the CRR holder's portfolio of virtual awards from the IFM on the power flows of a constraint. The flow impact is calculated by multiplying the CRR holder's virtual awards at a node by the shift factor of that node relative to the constraint. This product is computed for each node for which the convergence bidding entity had virtual awards, and the flow impact is the sum of those products. In this context the shift factor means the factor to be applied to a resource's expected change in output to determine the amount of flow contribution that change in output will impose on an identified transmission facility or flowgate.

These tariff changes satisfy the directives in the Convergence Bidding Design Order. First, the tariff changes clearly and objectively state the instances that warrant mitigation under the ISO's automated CRR settlement rule. For example, step two under Section 11.2.4.6 sets forth a clear and objective two-part test for determining if congestion on a constraint has been significantly impacted by the virtual awards that were awarded to the scheduling coordinator that represents the CRR holder: (i) the flow impact must be in the direction to increase the value of the CRR holder's CRR portfolio, and (ii) the flow impact must exceed the configurable threshold percentage of the flow limit for the constraint, with the threshold percentage initially set at 10 percent, subject to adjustment based on analysis using appropriate analytical tools and notification on a quarterly basis to the Commission.

Further, the tariff changes set forth in clear and objective language the actual measures to be used under the CRR settlement rule. Step four of Section 11.2.4.6 states that the ISO will adjust, pursuant to specified formulas, the peak or off-peak period revenue from the CRR holder's CRRs in the event that, over the peak or off-peak period of a day, the constraint's contribution to the day-ahead market value of the CRR holder's CRR portfolio exceeds the constraint's contribution to the HASP or real-time market value of the CRR holder's CRR portfolio.

The rest of the tariff changes to implement the CRR settlement rule are stated in similarly clear and objective terms. For these reasons, the ISO's proposed CRR settlement rule meets the requirements of the Convergence Bidding Design Order.

The ISO also proposes to include language in Section 11.2.4.6 specifying that all adjustments of CRR revenue calculated pursuant to Section 11.2.4.6 will be added to the CRR balancing account. Similarly, the ISO proposes to revise Section 11.2.4.5 of the ISO tariff to state that the CRR balancing account will accumulate any adjustments of CRR revenue due to convergence bidding or intertie scheduling practices as described in Section 11.2.4.6.

2. Authority to Suspend or Limit Convergence Bidding

The ISO, in the Convergence Bidding Design Filing, requested Commission authorization to suspend or limit convergence bidding by market participants in order to quickly respond to any problems that may occur under nodal convergence bidding. The ISO proposed to exercise that authority in the event that convergence bidding by any particular participant or group of participants is found to (1) detrimentally affect grid or market operations, (2) contribute to an unwarranted divergence in prices in the IFM and real-time market, or (3) otherwise distort competitive market outcomes. Any such suspension or limitation of convergence bidding would be subject to Commission review and approval.[54]

In the Convergence Bidding Design Order, the Commission agreed in principle that the ISO should be granted this suspension authority, "subject to clearly and objectively defined tariff provisions that explain the instances in which the CAISO will exercise such authority."[55] The Commission directed the ISO to clearly and objectively define phrases such as "detrimentally affects," "unwarranted divergence," and "distorts." The Commission also directed the ISO, when it is possible to do so, to consult with market participants whose bids are subject to suspension prior to taking any such action.[56]

The ISO proposes to add new Section 39.11.2 to its tariff to implement the suspension or limitation of convergence bidding in accordance with the Commission's directives. Section 39.11.2.1 sets forth provisions regarding suspension or limitation generally and states that the ISO may suspend or limit the ability of one or more scheduling coordinators to submit virtual bids for any of the reasons set forth in Section 39.11.2.2. As discussed below, if the conditions set forth in Section 39.11.2.2(a) (concerning detrimental effects on system reliability or grid operations), Section 39.11.2.2(b) (concerning unwarranted divergence in prices other than shadow prices), or Section 39.11.2.2(c) (concerning unwarranted divergence in shadow prices) are met, the ISO may suspend or limit convergence bidding, subject to the "due process" provisions of Section 39.11.2.3. As discussed in the attached declaration of Eric Hildebrandt, Director of the DMM,[57] these tariff provisions fully comply with the Commission's directives.

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[54] Convergence Bidding Design Filing at 22-23.

[55] Convergence Bidding Design Order at P 88.

[56] *Id.*

[57] Declaration of Dr. Hildebrandt at 3-11. Dr. Hildebrandt's declaration is provided as Attachment E to the instant filing.

Section 39.11.2.2(a) provides that the ISO may suspend or limit the ability of one or more scheduling coordinators to submit virtual bids if the ISO determines that convergence bidding activities of one or more scheduling coordinators detrimentally affect system reliability or grid operations. Section 39.11.2.2(a) provides that convergence bidding activities can detrimentally affect system reliability or grid operations if such activities contribute to threatened or imminent reliability conditions, including but not limited to the following circumstances:

(i) Submitted virtual bids create a substantial risk that the ISO will be unable to obtain sufficient energy and ancillary services to meet real-time demand and ancillary service requirements in the ISO balancing authority area.

(ii) Submitted virtual bids render the ISO day-ahead market software unable to process bids submitted into the day-ahead market.

(iii) Submitted virtual bids render the ISO unable to achieve an alternating current ("AC") solution in the day-ahead market for an extended period of time.

Section 39.11.2.2(b) states that the ISO may suspend or limit the ability of one or more scheduling coordinators to submit virtual bids if the ISO determines that convergence bidding activities of one or more scheduling coordinators cause or contribute to unwarranted divergence in prices between the day-ahead market and the HASP or real-time market.[58] The ISO will determine whether convergence bidding causes or contributes to unwarranted divergence in prices in the day-ahead market and the HASP or real-time market, as applicable, using the following methodology:

(i) The ISO will calculate the average divergence between day-ahead prices and real-time prices for the ISO balancing authority area over a four-week period or such other period of time that the ISO determines to be appropriate.

(ii) The ISO will determine whether there are any Eligible PNodes and/or Eligible Aggregated PNodes at which: (A) the absolute value of the average divergence between day-ahead prices and real-time prices over that period of time or an appropriate subset of that period of time exceeded the system-wide average divergence in prices calculated pursuant to subsection (i), immediately above, by a percentage established by the ISO pursuant to the applicable Business Practice Manual and (B) the convergence bidding activities of one or more

[58] Section 39.11.2.2(b) addresses unwarranted divergence in prices other than shadow prices. The latter are addressed in Section 39.11.2.2(c), discussed below.

> scheduling coordinators on behalf of one or more convergence bidding entities significantly contributed to this excess divergence.

These criteria in Section 39.11.2.2(b) clearly and objectively define the circumstances in which an unwarranted divergence in prices may occur. The criteria are similar but not identical to Commission-approved tariff provisions authorizing the Midwest Independent Transmission System Operator, Inc. ("Midwest ISO") to suspend or limit convergence bidding by individual participants in the event of an unwarranted divergence in prices.[59] Like the Midwest ISO, the California ISO will calculate the average divergence between day-ahead and real-time prices over a four-week period or other appropriate time period. However, the Midwest ISO calculates whether convergence bidding activity caused an average hourly divergence of greater than ten percent or less than negative ten percent over the time period, whereas the California ISO will calculate whether convergence bidding activity significantly contributed to an average divergence over the time period in excess of the system-wide average divergence by a percentage established in the applicable Business Practice Manual.

The ISO's proposed modifications of the Midwest ISO's approach are justified and reasonable modifications. The ISO proposes that the trigger for its authority to suspend or limit convergence bidding will be based on a pattern over time of market participants significantly contributing to a defined divergence between day-ahead and real-time prices. Defining the system-wide average divergence as "normal" divergence and using statistical measures to determine what constitutes a significant deviation from that norm is a just and reasonable means of identifying inappropriate divergence. Moreover, it is appropriate for the ISO to set forth in the Business Practice Manual the percentage to be used in determining when significant divergence exists. First, the percentage is not a rate, term or condition. It simply is a factor used in an analytic tool for triggering when additional investigation may be warranted. Second, in the initial period after convergence bidding is implemented, the ISO anticipates that variances in divergence may fluctuate fairly quickly and frequently. Therefore, including the percentage in the Business Practice Manual gives the ISO needed flexibility to adjust it based on actual market conditions. The ISO expects that there will be less need to adjust the percentage as the ISO collects more data on convergence bidding activity over time. Following the initial implementation of convergence bidding, the ISO expects that the percentage will need to be adjusted only rarely, if at all. For these reasons, the Commission should accept the ISO's modified version of the Midwest ISO's approach. As the Commission has explained, "the courts and this Commission have recognized that there is not a single just and reasonable rate. Instead, we evaluate [proposals under Section 205 of the FPA] to determine whether they fall into a zone of reasonableness.

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[59] *See* Midwest ISO Open Access Transmission, Energy and Operating Reserve Markets Tariff, Sections 65.5.2-65.5.3 ("Midwest ISO OATT").

So long as the end result is reasonable, the [proposal] will satisfy the statutory standard."[60]

Pursuant to Section 39.11.2.2(c), the ISO may suspend or limit the ability of one or more scheduling coordinators to submit virtual bids if the ISO determines that convergence bidding activities of one or more scheduling coordinators cause or contribute to an unwarranted divergence in shadow prices between the day-ahead market and the HASP or real-time market that contributes to a significant divergence in LMPs at any Eligible PNode and/or Eligible Aggregated PNode. The ISO will base each such determination on a calculation of the deviation between average hourly shadow prices in the day-ahead market and the HASP or real-time market, as applicable, during a rolling four-week period, or such other period that the ISO determines to be appropriate given the convergence bidding activity under review. If the ISO determines that convergence bidding activity has resulted in a deviation over that period between average hourly shadow prices in the day-ahead market and the HASP or real-time market that is greater than a percentage established by the ISO pursuant to the applicable Business Practice Manual and such divergence in shadow prices contributes to a significant divergence in LMPs at any Eligible PNode and/or Eligible Aggregated PNode, the ISO will determine that convergence bidding causes or contributes to an unwarranted divergence in shadow prices. This proposed approach combines elements of the Midwest ISO's approach and the California ISO's proposed approach regarding other types of prices. For the reasons explained above, the Commission should find that the provisions in Section 39.11.2.2(c) regarding shadow prices are just and reasonable.

The ISO does not propose to implement any tariff provisions authorizing the ISO to suspend or limit convergence bidding that would otherwise distort competitive market outcomes. Although the ISO proposed to request that authority in the Convergence Bidding Design Filing, the ISO subsequently determined, pursuant to discussions in the stakeholder process that led to the drafting of the convergence bidding tariff language, that the provisions of Section 39.11.2.2 discussed above address in a clear and objective manner the ISO's concerns about distortions of competitive market outcomes. Therefore, the ISO has concluded that it does not need to propose additional tariff language regarding such distortions at this time.

The provisions of Section 39.11.2.2 give the ISO the authority, but not the obligation, to suspend or limit convergence bidding activity. In every case where suspension or limitation may be warranted, the ISO will perform further analysis (including conferring with the affected market participants, if practicable) prior to concluding that suspension or limitation is warranted, and will employ other due process as set forth in Section 39.11.2.3. Consistent with the Commission's directives, Section 39.11.2.3(a) provides that, whenever practicable, prior to

[60] *Calpine Corp. v. California Independent System Operator Corp.*, 128 FERC ¶ 61,271, at P 41 (2009) (citations omitted).

suspending or limiting convergence bidding, the ISO will notify affected scheduling coordinators and affected convergence bidding entities that the ISO intends to suspend or limit convergence bidding and will confer and exchange information with the affected scheduling coordinators and affected convergence bidding entities in an effort to resolve any dispute as to whether suspension or limitation of convergence bidding is warranted. In cases where taking such actions prior to suspending or limiting convergence bidding is not practicable, the ISO will promptly notify the affected scheduling coordinators and affected convergence bidding entities that the ISO has suspended or limited convergence bidding, and will promptly confer and exchange information with the affected scheduling coordinators and affected convergence bidding entities in an effort to resolve any dispute as to whether suspension or limitation of convergence bidding is warranted. Within two business days of the notice of suspension or limitation, the ISO will provide the affected scheduling coordinators and affected convergence bidding entities with information justifying the decision to suspend or limit convergence bidding.

Pursuant to Section 39.11.2.3(b), the ISO will submit to the Commission supporting documentation, including any information provided to the ISO by the affected scheduling coordinators and affected convergence bidding entities, within ten business days after any suspension or limitation of convergence bidding begins, unless the ISO concludes prior to the end of the ten business day period that the suspension or limitation of convergence bidding was or is not warranted. The ISO will provide the affected scheduling coordinators and affected convergence bidding entities with a copy of any supporting documentation submitted to the Commission.

Section 39.11.2.3(c) states that suspension or limitation of convergence bidding by the ISO will remain in effect for up to ninety days after the ISO submits its initial supporting documentation to the Commission, unless the Commission directs otherwise. After the ninety day period expires, the suspension or limitation of convergence bidding will remain in effect only if the Commission permits or requires it to remain in effect. Thus, the Commission will in all cases be able to direct the length of a suspension or limitation of convergence bidding.

As set forth in Section 39.11.2.3(d), the ISO will maintain the confidentiality of the identities of the affected scheduling coordinators and affected convergence bidding entities until such time as the Commission concludes that the circumstances or the conduct of the affected scheduling coordinators and affected convergence bidding entities warranted suspension or limitation of convergence bidding. Finally, under Section 39.11.2.3(e), the ISO will have the authority to discontinue the suspension or limitation of convergence bidding at any time it determines such suspension or limitation is no longer appropriate and will notify the Commission if such suspension or limitation of convergence bidding is discontinued after supporting information concerning such suspension or limitation has been submitted to the Commission.

The ISO will apply the provisions of Section 39.11.2 to the convergence bidding activities of individual scheduling coordinators. There may also be circumstances in which a market disruption or potential market disruption will require the ISO to suspend or limit the ability of *all* scheduling coordinators to submit virtual bids either at a particular location or system-wide.[61] Section 7.7.15.1 of the ISO tariff has been revised to provide that the actions the ISO may take in the event of a market disruption, to prevent a market disruption, or to minimize the extent of a market disruption include (but are not limited to) suspending or limiting the ability of all scheduling coordinators to submit virtual bids on behalf of convergence bidding entities at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes. These proposed revisions merely extend to the new convergence bidding market feature the authority the ISO already has under Section 7.7.15.1 to close or cancel the applicable ISO market in the event of a market disruption, to prevent a market disruption, or to minimize the extent of a market disruption.[62]

Further, in the Convergence Bidding Design Filing, the ISO explained that, after convergence bidding is implemented, it plans to monitor the IFM and real-time schedules supporting inter-scheduling coordinator trades ("inter-SC trades") and seller's choice contracts to determine if market manipulation is occurring.[63] If this monitoring uncovers market manipulation, the ISO's preferred approach is to apply behavioral restrictions on parties to seller's choice contracts, such as restricting the right to submit virtual bids, either entirely or limited to nodes that affect inter-SC trades.[64] The Commission accepted this ISO approach.[65] Therefore, after convergence bidding goes into effect, the ISO will monitor locations at which inter-SC trades associated with seller's choice contracts occur and will take appropriate action under the ISO tariff as necessary, including

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[61] A market disruption is defined in Appendix A to the ISO tariff as an action or event that causes a failure of an ISO market, related to system operation issues or system emergencies referred to in Sections 7.6 and 7.7 of the ISO tariff.

[62] *See* ISO tariff, Sections 7.7.15.1(c)-(e). The ISO also proposes to include in Section 39.11.2.1 a cross-reference to Section 7.7.15.

[63] Seller's choice contracts are contracts that the State of California entered into during the 2000-2001 western energy crisis that permit the seller to select the location for the delivery of energy. The seller's choice settlement in Commission Docket No. EL04-104 addresses the treatment of these contracts under the new ISO market and allows contractual delivery at generation nodes up to the feasible level of physical supply at the nodes. The ISO established market rules for physical inter-SC trades to prevent sellers under seller's choice contracts from choosing nodes for delivery that would alter their effective congestion charges, allowing them to pay less for inter-SC trade settlement and potentially shifting congestion costs to buyers. Convergence Bidding Design Filing at 23-24.

[64] *Id.* at 24.

[65] *See* Convergence Bidding Design Order at P 85.

actions taken pursuant to Section 39.11.2, Section 37.7 (prohibiting market manipulation), and any other applicable provisions in the tariff.

F. Use of Megawatt Limits to Ensure an AC Solution

In the Convergence Bidding Design Filing, the ISO explained that it will continue to achieve an AC solution in the day-ahead market with the inclusion of virtual bids to the greatest extent practicable. The ISO stated that, in order to increase the likelihood of achieving an AC solution with convergence bidding, the ISO plans to include in its software the capability of enforcing megawatt limit constraints on a locational basis to limit the amount of bids that clear at a particular location or set of locations when an AC solution is not otherwise attainable. The ISO also explained that all of the other ISOs and RTOs have the ability to impose bid limitations of different types on virtual bids, and that the ISO's use of megawatt limits in circumstances where an AC solution cannot be achieved is consistent with authority of other ISOs and RTOs.[66]

The Commission approved in principle the ISO's plan to enforce megawatt limit constraints when an AC solution is not otherwise attainable. The Commission also directed the ISO to include additional detail in its tariff amendment filing on the use of an AC solution and megawatt limit constraints, implement that mechanism so as to minimize the ISO's manual intrusions in the market, and ensure that all bids – physical and virtual – are treated equally under the megawatt limit constraints.[67]

Section 30.10 sets forth in detail how the AC solution and megawatt limit constraints will work. Section 30.10 provides that the ISO will achieve an AC solution in the day-ahead market to the extent practicable. If and when it is impracticable to achieve an AC power flow solution without the initial enforcement of nodal MW limit constraints, the ISO will apply nodal MW constraints to Eligible PNodes (except for Eligible PNodes established for interties, which are addressed through the process described in Section 31.8 of the ISO tariff).[68] As explained in Section 30.10, the ISO will apply such nodal MW constraints using the following three-step process:

(1) The ISO will calculate a MW limit for each Eligible PNode other than an Eligible PNode established for an intertie. For an Eligible PNode associated with physical supply resource, the MW limit will be equal to a factor multiplied by the PMax of the physical supply

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66 Convergence Bidding Design Filing at 24-25, 31-32.

67 Convergence Bidding Design Order at P 93.

68 Section 31.8 of the ISO tariff is discussed above in Section II.D.2 of this transmittal letter.

resource. For an Eligible PNode associated with a physical demand resource, the MW limit will be equal to a factor multiplied by the nodal load forecast of the Eligible PNode calculated as the MW portion of the system demand forecast that is distributed to the Eligible PNode according to the corresponding system load distribution factor associated with the Eligible PNode. The factors used in these calculations will be determined in accordance with a process set forth in the Business Practice Manuals.

(2) For each of the Eligible PNodes or group of Eligible PNodes, the ISO will calculate the percentage by which the sum of the MW amounts of all energy supply bids, demand bids, and virtual bids exceeds the MW limit calculated pursuant to step (1).

(3) Starting with the Eligible PNodes or group of Eligible PNodes at which the MW limits would be exceeded by the largest percentages, and working in descending order of the Eligible PNodes or group of Eligible PNodes that would exceed their MW limits ranked by the extent to which the corresponding MW limits would be exceeded, the ISO will apply the MW limits to all energy supply bids, demand bids, and virtual bids at the applicable Eligible PNodes or group of Eligible PNodes and run iterations of the IFM until the ISO markets can achieve an AC solution. The application of the MW limit will be enforced by means of a MW limit constraint on the sum of bids that are applicable to the Eligible PNodes or group of Eligible PNodes. The MW limit constraints will be enforced in the IFM optimization engine to curtail the bids at the Eligible PNodes or group of Eligible PNodes that have been identified as candidates for causing AC convergence issues. The IFM optimization engine will use the economic criteria based on bid prices and effectiveness of bids to mitigate the violation of the MW limit at the Eligible PNode or group of Eligible PNodes.

Under the Commission's "rule of reason," the ISO is required to include in its tariff those practices that significantly affect rates and service, that are realistically susceptible of specification, and that are not so generally understood in any contractual arrangement as to render recitation superfluous.[69] The provisions of Section 30.10 contain sufficient detail to satisfy the rule of reason.

Further, as explained in the attached declaration of Dr. Abdul-Rahman, the megawatt limit constraints under Section 30.10 will be primarily automated in nature and will involve only minimal manual action by the ISO. The ISO's market software will rank the Eligible PNodes or groups of PNodes that exceed their MW

[69] *See City of Cleveland v. FERC*, 773 F.2d 1368, 1376 (D.C. Cir. 1985).

limits by the extent to which their corresponding MW limits would be exceeded. Starting at the top of that list of candidates for causing AC convergence issues, the market software will apply the MW limits to all energy supply bids, demand bids, and virtual bids at the applicable Eligible PNodes or group of PNodes and run iterations of the IFM until the ISO markets can achieve an AC solution. The only manual action by the ISO will be determining how far down the list the ISO needs to go before it runs each iteration of the IFM. This determination will partly depend on where key or weak locations on the transmission system are ranked in the list. The ISO will gain a better understanding of how to make this determination through market simulation and testing that will be conducted prior to the implementation of convergence bidding.[70]

Moreover, as Dr. Abdul-Rahman explains, the nodal MW constraints will not discriminate between physical and virtual bids because they will apply at each Eligible PNode or group of PNodes to all energy supply bids, demand bids, and virtual bids.[71] Dr. Abdul-Rahman also explains that he discussed the methodology described above with stakeholders at two meetings of the Market Performance and Planning Forum, held on March 16 and April 27, 2010.[72]

G. Convergence Bidding Certification Requirements

The ISO, in the Convergence Bidding Design Filing, explained that all market participants are required to meet certain certification requirements specified in the ISO tariff and the Business Practice Manuals in order to participate in the ISO markets. Because convergence bidding entities and the scheduling coordinators that represent them will likewise take part in the ISO markets, the ISO proposed to require them to meet certification requirements as well. The ISO stated that it will require each convergence bidding entity to be represented by a scheduling coordinator or be a scheduling coordinator itself, and to execute an agreement that sets forth the respective rights and obligations of the ISO and the convergence bidding entity and binds the convergence bidding entity to comply with the applicable provisions of the ISO tariff. Convergence bidding entities will also be required to disclose information concerning their affiliates as is also required of CRR entities.[73] A convergence

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[70] Declaration of Dr. Abdul-Rahman at 8-10.

[71] *Id.* at 10-11.

[72] *See Market Performance and Planning Forum* (Mar. 16, 2010), at slide 36; *Market Performance and Planning Forum* (Apr. 27, 2010), at slide 50. These presentations are available on the ISO's website at http://www.caiso.com/2756/27569a323ba80.pdf and http://www.caiso.com/2781/2781bbc721b40.pdf, and the relevant portions of the presentations are provided in Appendix 3 to Dr. Abdul-Rahman's declaration.

[73] Convergence Bidding Design Filing at 25.

bidding entity and the unique scheduling coordinator that represents it will be subject to a mutual requirement to identify the unique scheduling coordinator identification numbers that will be used on behalf of the convergence bidding entity for virtual bids. The Commission found the ISO's proposed certification requirements to be reasonable.[74]

The instant filing contains a number of provisions to implement the convergence bidding certification requirements. The ISO proposes to add to Appendix B.15 of the ISO tariff a *pro forma* convergence bidding entity agreement that sets forth the respective rights and obligations of the ISO and the convergence bidding entity. The convergence bidding entity agreement contains provisions that largely parallel the provisions of the existing scheduling coordinator agreement (see Appendix B.1 of the ISO tariff) and *pro forma* CRR entity agreement (see Appendix B.11 of the ISO tariff). Execution of the convergence bidding entity agreement is a prerequisite to becoming a convergence bidding entity. The ISO also proposes to modify Appendix A to include a definition of the term "convergence bidding entity agreement."

Further, the ISO proposes to revise Sections 4.5.1, 4.5.1.1.6.2, 4.5.3.7, 4.5.3.12, and 4.5.4.1 of its ISO tariff to require each convergence bidding entity to be represented by a scheduling coordinator or be a scheduling coordinator itself,[75] apply the tariff provisions regarding scheduling coordinators to convergence bidding, and exempt scheduling coordinators that only represent convergence bidding entities from certain ISO tariff requirements. The ISO also proposes to add new Section 4.5.2.2 to its tariff in order to specify requirements for each scheduling coordinator that is or represents one or more convergence bidding entities to provide the ISO with a list of the convergence bidding entities that it represents and the SCIDs that the scheduling coordinator will use to submit virtual bids for each convergence bidding entity.

In Section 4.14, the ISO proposes to include provisions regarding the relationship between the ISO and convergence bidding entities, the procedure to become a convergence bidding entity, convergence bidding entities' ongoing obligations (including affiliate disclosure requirements), and termination of a convergence bidding entity agreement. These provisions largely parallel similar existing tariff provisions regarding scheduling coordinators (see Section 4.5 of the ISO tariff) and CRR holders and candidate CRR holders (see Section 4.10 of the ISO tariff). In addition, the ISO proposes to add new Section 39.11.1 to its tariff to state that each convergence bidding entity must satisfy the affiliate

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[74] Convergence Bidding Design Order at P 96.

[75] A convergence bidding entity may only be represented by one scheduling coordinator (including itself) at any given time.

disclosure requirements set forth in Section 4.14.2.1, and proposes to revise Section 12.1.1.2 to add cross-references to Sections 4.14.2.1 and 39.11.1.

H. Credit Policy for Convergence Bidding

Pursuant to the ISO's existing credit policy, each market participant is required to maintain an aggregate credit limit (consisting of an unsecured credit limit, if any, and posted financial security, if any) that equals or exceeds the market participant's estimated aggregate liability (consisting of all known and reasonably estimated outstanding and unpaid obligations of the market participant to the ISO) at all times. The ISO monitors these amounts and requests additional collateral from market participants as necessary to ensure that their aggregate credit limits do not fall below their estimated aggregate liabilities.[76]

In the Convergence Bidding Design Filing, the ISO explained that it will modify its credit policy to ensure that entities submitting virtual bids, like market participants submitting all other types of bids, meet the ISO's credit requirements. The ISO explained that the revisions to its credit policy would include credit checking of virtual bids as part of the bid validation process using a 95th percentile reference price to calculate the estimated value of virtual bids, and once awarded, the adjustment of the value of virtual bids based on final market clearing prices, and related credit policy changes. The ISO explained that its proposed approach uses the most current information available about a market participant's credit exposure and appropriately balances the two competing goals that the ISO must always balance in its credit policy: (1) ensuring that all participants in the ISO's markets are creditworthy or post sufficient collateral to meet their financial obligations in the ISO markets, in order to avoid exposing other market participants to undue credit risk; and (2) ensuring that the credit requirements do not impose unreasonable burdens on market participants.[77]

The Commission found that "the CAISO's proposed credit policy for virtual bidders is reasonable in that it should adequately protect other market participants from financial risk, while not discouraging the active participation of virtual bidders in the CAISO's energy markets."[78] The Commission also specifically found that the use of a 95th percentile reference price for determining convergence bid credit requirements is appropriate.[79]

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[76] *See generally* ISO tariff, Section 12.

[77] Convergence Bidding Design Filing at 25-29.

[78] Convergence Bidding Design Order at P 104.

[79] *Id.*

The ISO proposes to add new Section 12.8 to its tariff in order to implement the convergence bid credit policy approved in the Convergence Bidding Design Order. Pursuant to Section 12.8.1, the ISO will perform credit checks on virtual bids submitted in the day-ahead market as part of the bid validation process. Section 12.8.2 specifies the 95th percentile reference price and the time periods for which the ISO will calculate that reference price; in connection with these tariff changes. Section 12.8.3 concerns adjustment of estimated aggregate liability for market participants after the close of the day-ahead market in order to account for virtual awards cleared through the market, and Section 12.8.4 concerns adjustment of estimated aggregate liability for market participants after the close of the real-time market in order to reflect the real-time settlement of virtual awards.

The ISO is also proposing to add new Section 12.8.1.2 to the tariff to indicate how the ISO will handle any outages of the credit checking system. The design specifications for this system specify an availability of 99.999%, the same design specification for the ISO's Scheduling Infrastructure Business Rules ("SIBR").[80] This percentage is the equivalent of being available for all but nine minutes on average in the course of a year. Because of the high degree of availability, the ISO believes it is reasonable to allow virtual bids to pass to the market in the absence of a credit check as part of the bid validation process in the event of an outage, and in the absence of any suspension of virtual bidding, that extends beyond the close of the day-ahead market. If, however, the ISO experiences an extended unavailability of the convergence bidding credit functionality, the ISO is proposing tariff authority in Section 12.8.1.2 to suspend virtual bidding temporarily until the functionality is restored. The provisions of Section 12.8.1.2 are similar to provisions contained in the Market Services Tariff of the New York Independent System Operator, Inc. ("New York ISO").[81]

Section 6.5.2.3.6 specifies that the ISO will publish virtual bid reference prices for both the HASP and the real-time market prior to the applicable reference period for the virtual bid reference prices. Section 12.1.3.1.1 provides that the ISO's calculation of estimated aggregate liability for each market participant will include adjustments resulting from virtual bid submission charges (discussed in Section II.I.2 of this transmittal letter, below) and the submission of virtual bids and/or receipt of virtual awards pursuant to Section 12.8 of the tariff. All of these tariff changes are consistent with the Commission's approval of the convergence bidding credit policy in the Convergence Bidding Design Order.

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[80] The ISO added Section 12.8.1.2 to explain how the ISO would deal with outages of the credit checking system. The proposal was shared with stakeholders in a conference call held on June 22, 2010.

[81] *See* New York ISO Market Administration and Control Area Services Tariff, Section 5.2(B) (available at http://www.nyiso.com/public/webdocs/documents/tariffs/market_services/services_tariff.pdf).

I. Settlement of Convergence Bidding Transactions

1. Basis for Settlement

The ISO, in the Convergence Bidding Design Filing, stated that virtual bids that are cleared in the IFM will be settled based on the differences between the day-ahead LMPs and the real-time LMPs at the relevant locations. For convergence bidding transactions at internal nodes, the ISO will multiply the day-ahead LMPs at those nodes by the day-ahead cleared megawatt-hours of virtual supply and virtual demand, will multiply the simple average of the five-minute real-time LMPs at the internal nodes by the day-ahead cleared megawatt-hours of virtual supply and virtual demand, and will perform settlements based on the differences between those calculated amounts. For convergence bidding transactions at the interties, the ISO will multiply the day-ahead LMPs at those interties by the day-ahead cleared megawatt-hours of virtual supply and virtual demand, will multiply the real-time LMPs at the interties (which are based on hourly HASP prices) by the day-ahead cleared megawatt-hours of virtual supply and virtual demand, and will perform settlement based on the differences between those calculated amounts.[82] In the Convergence Bidding Design Order, the Commission did not require the ISO to revise or modify these settlement principles.

The ISO proposes to add new Section 11.3 to its tariff to implement the settlement design described in the Convergence Bidding Design Filing. In addition, the ISO proposes to make the following modifications to the settlement provisions of the ISO tariff to address the treatment of virtual awards in ISO settlements:

- Revision of Section 11.8 to specify that virtual awards are not eligible for bid cost recovery but are eligible for make-whole payments due to price corrections pursuant to Section 11.21.2.[83]

- Addition of new Section 11.21.2 to state that, if the ISO corrects an LMP pursuant to Section 35 of the ISO tariff that affects a virtual award such that either a portion or the entirety of the bid curve associated with the virtual award becomes uneconomic, then the ISO will calculate and apply the price correction for settlement of virtual awards as follows: the total

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[82] Convergence Bidding Design Filing at 29-30.

[83] In the convergence bidding stakeholder process, market participants generally agreed that virtual awards should not be eligible for bid cost recovery but expressed concern about that virtual bids might be at risk for energy bid cost recovery. The ISO believes that there is little to no risk that virtual awards would be less than the energy bid cost. The ISO nevertheless agreed that it would monitor this issue and consider a possible future tariff amendment in the event there market results demonstrate that there is an energy bid cost recovery issue for virtual awards.

cleared MWhs of virtual awards multiplied by the corrected LMP, plus the make-whole amount.[84]

Revision of Sections 11.2.4.1 and 11.5.4.2 and the related definitions of Net Hourly Energy Charge and Real-Time Congestion Offset to ensure that any difference between settlements for virtual demand awards and virtual supply awards is allocated in the same manner as Demand and Supply are currently allocated.[85] These changes simply adapt existing tariff language to reflect the addition of costs associated with virtual awards.[86]

2. Grid Management Charge

In the Convergence Bidding Design Filing, the ISO explained that, because convergence bidding is solely a financial transaction, cost causation principles suggest that only certain of the service charges under the grid management charge ("GMC") should apply to convergence bidding. Only the following service charges will be applied to convergence bidding: the forward scheduling charge, the market usage day-ahead charge (only for the day-ahead market for energy), and the settlements, metering, and client relations charge.[87]

The ISO also explained that, pursuant to discussions in the convergence bidding stakeholder process, the ISO proposed to create a new service charge for convergence bidding, which would be a set charge assessed on a dollars per

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[84] Specifically, pursuant to Section 11.21.2, the make-whole amount for virtual demand will be calculated on an hourly basis determined by the area between the bid curve and the corrected LMP, which is calculated as the MWhs in each of the cleared bid segments of the virtual demand bid multiplied by the maximum of zero or the corrected LMP minus the bid segment price. For virtual supply, the make-whole amount will be calculated on an hourly basis determined by the area between the bid curve and the corrected LMP, which is calculated as the MWhs in each of the cleared bid segments of the virtual supply bid multiplied by the maximum of zero or the bid segment price minus the corrected LMP. The new tariff provisions described above are consistent with the existing make-whole provisions in the tariff, which the ISO Governing Board authorized at its February 10, 2010 meeting, the ISO filed in a tariff amendment in Docket No. ER10-966, and the Commission accepted in a letter order issued on May 27, 2010.

[85] As part of these tariff revisions, the ISO is proposing to delete the existing definition of Real-Time Congestion Offset and to revise the definition of Real-Time Congestion Fund, including replacing the term of that definition in order to maintain the use of the term Real-Time Congestion Offset. These changes are unrelated to the need to revise the definitions for the purpose of allocating costs associated with virtual awards; in other words, collapsing the two definitions into a single definition was purely a housekeeping matter.

[86] The tariff changes were not presented to stakeholders as the ISO only recently realized that changes might be appropriate. These changes do not reflect any change policy, only a recognition that pre-existing tariff provisions would need to be updated to reflect costs associated with virtual awards.

[87] Convergence Bidding Design Filing at 30.

cleared gross megawatt-hour basis. The revenue generated by the new convergence bidding service charge will be applied to the existing forward scheduling charge and market usage charge for the day-ahead market for energy. The ISO stated that the exact revenue requirement for the convergence bidding service charge would be established in the 2011 GMC extension stakeholder process.[88]

The Commission found the ISO's proposed charges related to the GMC to be reasonable.[89] The Commission also stated that the settlements, metering, and client relations charge "is the same charge that the CAISO currently assesses to all scheduling coordinators" and that "it is reasonable to continue to assess this charge to scheduling coordinators, even if they represent only virtual bidders."[90] The Commission noted it need not and would not rule on the level of the convergence bidding service charge until the ISO files tariff language to implement that charge in a subsequent proceeding.[91]

In order to implement the GMC-related provisions approved in the Convergence Bidding Design Order, the ISO proposes to revise Appendix A of its tariff to add the new defined term "virtual award charge" for the convergence bidding service charge discussed above. The ISO also proposes to revise Section 11.22.2.5 to reference the virtual award charge. Further, the ISO proposes to revise Parts A, C, and E of Schedule 1 of Appendix F of the tariff, which concern the calculation of the GMC and recovery and allocation of costs through the GMC, to incorporate provisions regarding the virtual award charge. Lastly, the ISO proposes to add new Section 11.22.2.5.9 to reference the revised provisions set forth in Appendix F of the ISO tariff.

This filing does not include any tariff changes to make the existing settlements, metering, and client relations charge applicable to scheduling coordinators that only represent virtual bidders, because no tariff changes are needed to achieve that result. Nor does this filing include any tariff changes to specify the level of the virtual award charge, because the exact level of that charge has not yet been finalized in the 2011 GMC extension stakeholder process. As required by the Convergence Bidding Design Order, when the exact level of the virtual award charge is determined, the ISO will file the tariff language to implement that charge in a subsequent proceeding. The ISO will submit its

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88 *Id.* at 30-31. Materials regarding the 2011 GMC extension stakeholder process are available on the ISO's website at http://www.caiso.com/2768/2768e445540e0.html.

89 Convergence Bidding Design Order at PP 111, 113.

90 *Id.* at P 114.

91 *Id.* at P 113.

filing in time for the Commission to issue an order on it prior to the planned February 1, 2011 implementation date for convergence bidding.

In the Convergence Bidding Design Filing, the ISO also proposed to charge a transaction fee of $0.005 per submitted convergence bid segment that passes the ISO's validation rules and is then passed on to the IFM. The ISO proposed that fee as a deterrent against "bid fishing," *i.e.*, the submission of large numbers of convergence bid segments that are likely to be uneconomic. The ISO stated that it will apply the revenues from the transaction fee as an offset to the GMC costs associated with convergence bidding.[92] The Commission found that the ISO's proposed transaction fee satisfies cost causation principles and noted that the "the CAISO proposes to set the fee at a nominal level that is at or below that of other RTOs and ISOs."[93]

The ISO proposes to revise Appendix A of its tariff to add the new defined term "virtual bid submission charge" for the transaction fee. The ISO also proposes to add language to Part A of Schedule 1 of Appendix F stating that all amounts collected from the assessment of the virtual bid submission charge in a given year will be used to offset the amount of virtual award charge for the next year. Further, the ISO proposes to revise Section 11.1.2 of the tariff to state that the types of charges that the ISO will settle will include virtual bid submission charges, and to add new Section 11.22.4 to the tariff to include the virtual bid submission charge of $0.005 per submitted convergence bid segment.

A virtual bid submission charge of $0.005 per convergence bid segment is at or below the level of similar virtual bid submission charges that other ISOs and RTOs assess.[94] Similar to its determinations as to other ISOs and RTOs, the Commission should find that the California ISO's virtual bid submission charge is just and reasonable because it is a "nominal charge . . . which will discourage frivolous bidding and allow the virtual traders to pay their fair share of [the ISO's] expenses since they benefit from the existence of [the ISO's] market infrastructure."[95]

In the Convergence Bidding Design Order, the Commission recommended that the ISO monitor whether the virtual bid submission charge continues to be

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[92] Convergence Bidding Design Filing at 31-32.

[93] Convergence Bidding Design Order at PP 111-12, 115.

[94] PJM assesses a virtual bid submission charge of $0.06 per bid segment, the New York ISO assesses a virtual bid submission charge of $0.10 per virtual bid (regardless of segments), and ISO New England assesses a virtual bid submission charge of $0.005 per bid segment. Convergence Bidding Design Filing at 32.

[95] *ISO New England, Inc.*, 106 FERC ¶ 61,294, at P 30 (2004).

needed after it is implemented and to "consider eliminating it at such time that it proves to be unnecessary."[96] The ISO will monitor the continued need for the virtual bid submission charge pursuant to that Commission directive.

J. Allocation of Cost Uplifts to Convergence Bidders

The ISO, in the Convergence Bidding Design Filing, explained that cost causation principles require virtual bidders to be charged for costs they have caused to occur, and that consequently virtual demand bids should be subject to uplift costs related to the increased unit commitment in the IFM caused by convergence bidding. Similarly, virtual supply bids should be subject to uplift costs related to the increased unit procurement within RUC in the day-ahead market caused by convergence bidding. Based on these considerations, the ISO proposed to modify the existing cost uplift allocation provisions in the ISO tariff to include methodologies for allocating IFM bid cost uplift and RUC bid cost uplift.[97] The ISO proposed to implement these methodologies through formulas that include netting of virtual supply and virtual demand, as well as threshold tests applicable to the IFM and RUC for determining the circumstances in which uplift costs will be allocated to virtual bids. The ISO stated that, following extensive discussion with stakeholders holding divergent views on how IFM and RUC cost uplifts should be allocated, the ISO crafted its proposed methodologies to satisfy cost causation principles and be fair and reasonable for all market participants as best as can be determined in advance of any actual market experience, while also being administratively workable for the ISO.[98]

In the Convergence Bidding Design Order, the Commission stated that it was unable to determine, based on the information provided in the Convergence Bidding Design Filing, whether the ISO's proposed allocation of uplift costs to virtual bidders is just and reasonable. The Commission directed the ISO to include additional support in its tariff amendment filing implementing its proposed methodologies. Specifically, the Commission directed the ISO to "consider thoroughly all of the objections raised by intervenors, and either modify its proposal in response to the objections, or explain why no modification is needed or desirable."[99]

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[96] Convergence Bidding Design Order at P 115.

[97] Net IFM bid cost uplift is allocated in two tiers pursuant to Section 11.8.6.4 of the ISO tariff, and RUC compensation costs are allocated in two tiers pursuant to Section 11.8.6.5.3 of the ISO tariff.

[98] Convergence Bidding Design Filing at 33-35.

[99] Convergence Bidding Design Order at P 128.

The Commission also directed the ISO to explain in greater detail how convergence bidding contributes to costs in a way that corresponds to the proposed allocation methodologies.[100] The Commission stated that "as a general rule, cost causation principles are satisfied so long as there is 'an articulable and plausible reason to believe that the benefits are roughly commensurate' with the costs."[101] The Commission also directed the ISO to consider the burdens (*e.g.*, transaction costs) being placed on virtual bidders when it develops its final cost allocation proposal.[102] The Commission stated that it "wants to ensure that uplift costs are allocated fairly among all bidders who cause increased costs, without unduly burdening a particular group of bidders."[103]

The ISO has thoroughly considered the objections regarding the ISO's cost uplift allocation proposals raised by the intervenors in the proceeding on the Convergence Bidding Design Filing.[104] The ISO provides its responses to those objections of SCE, PG&E, and the Financial Marketers below. As the ISO explains, the ISO has concluded that its cost uplift allocation proposals comply with all Commission directives. The ISO's responses to the intervenors' objections also address other directives in the Convergence Bidding Design Order, such as the requirement to explain further how the cost uplift allocation proposals satisfy cost causation principles. The principles supporting the cost uplift allocation proposals are also discussed in Ms. Miller's declaration.[105]

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[100] *Id.* at P 129.

[101] Convergence Bidding Design Filing at P 131 (quoting *Illinois Commerce Commission v. FERC*, 576 F.3d 470, 477 (7th Cir. 2009)).

[102] Convergence Bidding Design Order at P 132.

[103] *Id.* at P 134.

[104] The intervenors that raised those objections to the cost uplift allocation proposal were Southern California Edison Company ("SCE"), Pacific Gas and Electric Company ("PG&E"), and SESCO Enterprises, LLC, Jump Power, LLC, Silverado Energy LP, and JPTC, LLC (collectively, "Financial Marketers"). In the Convergence Bidding Design Order, the Commission also rejected arguments raised by the Financial Marketers concerning the allocation of cost uplifts based on estimates, the Financial Marketers' request that the ISO perform a cost-of-service study, and the Financial Marketers' claims that the Commission has previously exempted virtual bidders from uplift costs. Convergence Bidding Design Order at PP 122-24, 130, 133-34. Therefore, the instant tariff amendment filing does not address those arguments. In addition, the California Department of Water Resources ("SWP") argued that the ISO should develop a two-tier charge for real-time bid cost recovery uplifts, and SCE argued that the ISO should investigate the implementation of a cost allocation methodology for both physical and virtual demand that considers locational cost impact within one year of convergence bidding implementation. In the Convergence Bidding Design Order, the Commission found that these issues were beyond the scope of the convergence bidding proceeding and that the ISO need not address them in its tariff amendment filing. *Id.* at PP 125-26, 135-36. Therefore, the ISO does not address those issues in this filing.

[105] Declaration of Ms. Miller at 10-15.

SCE argued that the ISO's cost uplift allocation proposals fail to follow cost causation principles and inappropriately shift costs to physical market participants. SCE asserted that the netting component of the allocation proposals results in a potential subsidy to virtual resources, paid for by physical resources. SCE argued that because netting virtual demand against virtual supply has the potential to shift costs from virtual to physical bidders, it is unreasonable and should be eliminated from the cost uplift allocation proposals.[106]

There is no theoretical or factual basis to support these arguments. The ISO developed its IFM and RUC cost uplift allocation proposals to provide symmetrical treatment of costs created by virtual bids as well as cost offsets created by virtual bids. Virtual demand has the effect of offsetting costs in RUC as units are committed in the IFM to meet the additional demand resulting from accepted virtual demand bids. Virtual supply, on the other hand, reduces commitment costs in the IFM but may cause the ISO to have to replace virtual supply with physical supply in RUC. Given the offsetting effects of virtual demand and virtual supply, it is the incremental effect of costs created between the IFM and RUC that represents the true cost. Thus, the net effect of virtual bids as a whole will determine where additional uplift costs may have been incurred in the market.

In light of these considerations, a market participant with a net virtual demand position in its portfolio is not contributing to additional costs in RUC and should not be subject to RUC cost uplift for tier 1, because the virtual demand offsets the need for the ISO to procure additional resources in the RUC process by committing units in the IFM. On the other hand, a market participant with a net virtual supply position in its portfolio should not be subject to IFM cost uplift for tier 1, as the market participant did not contribute to commitment costs in the IFM. This proposed netting of virtual bids is similar to how the ISO applies netting to physical bids when determining the allocation of IFM and RUC tier 1 uplift costs under the current ISO tariff. Market participants are allocated IFM cost uplift for tier 1 based on the positive net of their scheduled demand minus self-scheduled generation and imports.[107] Market participants are allocated RUC cost uplift for tier 1 based on their net negative demand deviations, as it is those deviations that create the need for the ISO to procure RUC.[108] Because netting is used for uplift cost allocation to both virtual and physical bids, SCE is incorrect in claiming that the ISO's proposal discriminates against physical bids.

The ISO's netting proposal is also required for administrative feasibility. Pursuant to the ISO's existing market design, bid cost recovery is conducted on a

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106 Convergence Bidding Design Order at P 118 (citing SCE at 8-13).

107 ISO tariff, Section 11.8.6.4.

108 ISO tariff, Section 11.8.6.5.3.

system-wide basis, which is the same basis on which the ISO proposes to conduct netting of virtual bids. If the ISO were required to conduct netting on a more granular basis, it would have to redesign its entire bid cost recovery methodology to accommodate that greater granularity. Thus, such a redesign would have to increase the granularity not only of virtual bids but also of physical bids. The ISO should not be required to overhaul the existing methodology when simply extending it to include netting of virtual bids on a system-wide basis is administratively feasible.

The ISO's proposal to apply a netting approach is consistent with the Commission's treatment of other ISOs and RTOs. In a proceeding involving the Midwest ISO's approach to the allocation of cost uplifts of virtual transactions, the Commission found that "an allocation based on net virtual offers is just and reasonable" and that "an allocation that nets virtual offers and bids may be more precise."[109] The ISO proposes to net virtual offers and virtual bids in its allocation methodology.

SCE also argued that the Commission should reject the ISO's proposal to condition uplift allocation on satisfying threshold tests. SCE contended that the threshold tests are detached from cost-causation principles and provide another means for shifting costs from virtual to physical resources. SCE urged the Commission to eliminate the threshold tests and to apply uplift to both physical and virtual bids in a like manner, irrespective of real-time demand levels.[110] Similarly, PG&E argued that the only factors affecting IFM cost uplifts are net physical demand obligation and net virtual demand, not measured demand. Thus, PG&E asserted that the threshold tests run counter to cost-causation principles and should be eliminated.[111]

The threshold tests should be retained as proposed by the ISO. The virtual market, if performing as expected, should result in a commitment of units in the day-ahead that is closer to real-time conditions than would otherwise exist without virtual bids. With regard to virtual demand, the most accurate way to measure that performance is to examine where the market cleared with virtual bids as compared with the level of supply needed to serve real-time demand. If there is a net positive virtual demand position that clears the IFM and the physical demand that clears the IFM plus net cleared virtual demand awards results in the market clearing above the level of supply needed to serve real-time demand, virtual demand awards have contributed to additional unit commitment in the IFM and should therefore be allocated uplift costs for IFM tier 1. For virtual supply, if there is a net positive virtual

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109 *Ameren Services Co. v. Midwest Independent Transmission System Operator, Inc.*, 125 FERC ¶ 61,161, at P 116 (2008).

110 Convergence Bidding Design Order at P 119 (citing SCE at 13-16).

111 Convergence Bidding Design Order at P 121 (citing PG&E at 14-16).

supply position coming out of the IFM, then the ISO will need to procure RUC to make up for virtual supply that displaced physical supply in the IFM. In that case, it is reasonable to assess charges for RUC tier 1 uplift to market participants with a net virtual supply position in their bid portfolios.

The threshold tests are based on these core principles. Pursuant to the threshold tests, convergence bidding entities will be charged uplift costs only to the extent they result in additional costs beyond the costs that would have existed in the physical market absent those virtual bids. For example, the formula to apply IFM tier 1 uplift to virtual demand only applies charges to virtual demand if virtual demand resulted in the IFM clearing above what was needed to serve real-time load and in the case where the system-wide net of virtual awards that clear the IFM results in net positive virtual demand. Those charges are then allocated to market participants with a net virtual demand portfolio. If virtual demand contributed to the market clearing at or below the level needed to serve real-time load, these bids are not creating any additional costs and are contributing to the IFM clearing at an optimal level where the IFM would have cleared anyway if demand had been fully bid into the day-ahead market. The IFM is cleared to serve physical load, not virtual demand, and in that case any uplift costs would be allocated to physical demand. However, those costs would be no higher than would have existed without virtual demand in the market.

The formula for applying RUC tier 1 uplift costs to virtual supply first assesses whether or not there is a net positive virtual supply position on a system-wide basis in the market. If the answer is yes, the ISO will allocate RUC tier 1 uplift costs to market participants with a net positive virtual demand portfolio. On the other hand, if there is a net positive virtual demand position coming out of the IFM, then the ISO will not need to procure any additional capacity in RUC as a result of virtual supply displacing physical generation in the IFM. In that event, virtual supply did not contribute to any additional costs due to RUC procurement and should therefore not be assessed uplift charges.

As an alternative to the ISO's allocation proposals, SCE proposed the following uplift cost allocation rules: (1) virtual demand will be charged tier 1 IFM uplift charges regardless of the relationship between cleared demand and measured demand; (2) if the IFM clears below the real-time demand realized by the ISO, physical demand that clears in the real-time market should pay for the additional RUC associated with this difference; and (3) virtual supply should be charged RUC tier 1 uplift based on the amount of virtual supply that was awarded in the IFM and had to be replaced in the RUC process.[112]

For the reasons explained above, the ISO does not agree that convergence bidding entities should be allocated uplift costs based on gross virtual demand and

[112] Convergence Bidding Design Order at P 120 (citing SCE at 16-17).

gross virtual supply. SCE's proposed approach is not consistent with the allocation of uplifts to physical load and does not represent cost causation. Virtual demand and virtual supply have an offsetting effect on uplift costs between the IFM and RUC. Therefore, virtual supply and virtual demand should be netted before the allocation of applicable uplift costs for IFM and RUC are determined.

SCE also argued that the ISO should include virtual demand cleared in the IFM in the allocation of real-time imbalance energy offset costs.[113] The Commission found that this SCE issue was beyond the scope of the convergence bidding proceeding and that the ISO need not address the issue in its tariff amendment filing.[114] Nevertheless, the ISO will address the issue now. During the development of the convergence bidding design, the ISO evaluated which costs currently allocated through real-time uplift could be exacerbated by virtual supply. The ISO determined that virtual supply could have an impact on real-time uplift by displacing physical supply at a location, thus requiring the ISO to replace the physical supply at that location in the RUC process. Because short start units are selected in RUC but are not committed until real-time, those costs are allocated as part of real-time uplift. Therefore, the ISO proposes to revise Section 11.8.3 to specify that bid cost recovery costs related to short start units committed in real-time as a result of awarded RUC capacity will be included in RUC compensation costs. As reflected in that proposed tariff revision, the ISO has evaluated the impact of virtual supply on real-time uplift costs and proposes to allocate a portion of those costs to net virtual supply and underscheduled load as part of RUC uplift tier 1.

The Financial Marketers, on the other hand, asserted that the proposed allocation of IFM and RUC cost uplifts to virtual bids is not supported by cost causation evidence, fails to reflect the savings in uplift costs that would be produced by virtual bids, and fails to reflect the differences between virtual and physical transactions.[115]

These objections are also without any theoretical or factual basis. As discussed above, the ISO's uplift allocation methodology provides symmetrical treatment of costs created by virtual bids as well as cost offsets created by virtual bids. The ISO's uplift allocation methodology also follows the principle of netting virtual demand and supply to determine whether IFM uplift or RUC uplifts should be applied. Specifically, the ISO's formula for applying charges to net virtual demand for IFM uplift only applies IFM tier 1 uplift to market participants with net virtual demand when the system-wide net of all virtual bids results in positive net virtual demand and that net virtual demand results in the IFM clearing above what was

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113 Convergence Bidding Design Order at P 126 (citing SCE at 18-19).

114 Convergence Bidding Design Order at P 136.

115 Convergence Bidding Design Order at P 122 (citing Financial Marketers at 18).

needed to serve real-time demand. This formula takes into account that there must be a system-wide net positive virtual demand position in the market for there to possibly be increased uplift cost coming out of IFM that may have been caused by virtual demand. The formula does not penalize net virtual demand if it did not create any additional costs that would not have already existed.

The formula for RUC tier 1 uplift only applies charges to market participants with net virtual supply when the system net of all virtual bids results in net positive virtual supply, and then only to market participants that have a net positive virtual supply position in their portfolios. A net positive virtual supply position in the market would result in the ISO needing to replace virtual supply that displaced physical generation in the RUC process. If there is not a net positive virtual supply position in the market, the formula recognizes that there is no overall impact to RUC costs created by virtual supply.

The ISO's allocation proposals also satisfy the requirement of the Convergence Bidding Design Order that they not place undue burdens (*e.g.*, transaction costs) on virtual bidders. As discussed in Section II.I.2 of this transmittal letter, above, the only transaction cost associated with convergence bidding will be the virtual bid submission charge. The ISO has explained that the virtual bid submission charge satisfies cost causation principles because it will reasonably allocate costs to those causing them, is a nominal charge that is at or below the level of similar virtual bid submission charges that other ISOs and RTOs assess, will discourage frivolous bidding, and will allow virtual bidders to pay their fair share of the ISO's expenses since they benefit from the existence of the ISO's market infrastructure.

For the reasons discussed above, the ISO's cost uplift allocation proposals satisfy cost causation principles, result in a fair allocation of uplift costs among all bidders who cause increased costs, and do not unduly burden a particular group of bidders. Therefore, the Commission should find that the allocation proposals are justified and fall within the zone of reasonableness.[116]

The ISO proposes to allocate hourly net IFM bid cost uplift in tier 1 pursuant to new Section 11.8.6.4.1 of the ISO tariff, which consists partly of existing language from Section 11.8.6.4 and partly of new tariff language. The ISO does not propose any revisions to the existing methodology for allocating hourly net IFM bid cost uplift in tier 2, which is set forth in newly renumbered Section 11.8.6.4.2 of the ISO tariff.

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[116] "Statutory reasonableness is an abstract quality represented by an area rather than a pinpoint. It allows a substantial spread between what is unreasonable because too low and what is unreasonable because too high." *Montana-Dakota Utilities Co. v. Northwestern Public Service Co.*, 341 U.S. 246, 251 (1951).

The ISO proposes to allocate RUC compensation costs in tier 1 pursuant to new Section 11.8.6.5.3.1 of the ISO tariff, which consists partly of existing language from Section 11.8.6.5.3 and partly of new tariff language. The ISO also proposes to renumber the existing tariff provisions regarding allocation of RUC compensation costs in tier 2 as new Section 11.8.6.5.3.2 of the ISO tariff. Further, the ISO also proposes to modify those provisions to state that the ISO will allocate hourly RUC compensation costs in the second tier by charging the scheduling coordinator an amount equal to any remaining RUC compensation costs in proportion to the scheduling coordinator's metered ISO demand in any trading hour, including any RUC compensation costs that were not recovered in the first tier pursuant to Section 11.8.6.5.3.1.

K. Release of Convergence Bidding Information

In the Convergence Bidding Design Order, the Commission noted that the ISO had initiated a stakeholder process to address the release of convergence bidding information. The Commission stated that, while it believed in principle that a transparent policy regarding the release of convergence bidding information had its benefits, the Commission would not require the ISO to modify this element of the convergence bidding design unless and until the ISO submitted further revisions on the issue, based on the outcome of the stakeholder process.[117]

As discussed in the stakeholder process,[118] the ISO will release convergence bidding information on the same timeline as applies to physical bids. The ISO proposes to modify Section 6.5.6.1.1 of its tariff to set forth this information release policy.[119]

The ISO also concluded that it will release the net cleared quantities of virtual bids at each node (including each trading hub and default LAP) at the close of the real-time market for the trading day. After stakeholder discussion and input from the Market Surveillance Committee, the ISO concluded that this

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[117] Convergence Bidding Design Order at P 139.

[118] Materials provided by the ISO and market participants in the stakeholder process are available on the ISO's website at http://www.caiso.com/2479/2479df7147660.html.

[119] Section 6.5.6.1.1 currently states that the ISO will release information on its Open Access Same-Time Information System ("OASIS") 180 days following the applicable trading day. In the proceeding regarding the ISO's compliance with Commission Order No. 719, the ISO explained that it needs to revise the time period for providing public market information from 180 days to 90 days. ISO Compliance Filing, Docket No. ER09-1048-000, at 67 (Apr. 28, 2009). The ISO plans to revise Section 6.5.6.1.1 to include the 90-day information release provision in a tariff amendment including other miscellaneous clean-up items and clarifications to be filed later this summer. The ISO complies with the Commission's directive to release bid information with a 90-day lag.

information release policy will promote competition by encouraging market participation and thus increasing market liquidity, especially during the early stages of the virtual bidding market. In addition, the ISO will issue a daily market report that includes a summary of information regarding submitted and cleared physical and virtual bids. The report will incorporate features from similar reports issued by the Midwest ISO and the New York ISO.[120]

The ISO is not proposing to include any tariff changes to reflect this information release proposal. The information proposed for release is permissible under the ISO tariff.[121] Including unnecessary tariff provisions creates needless risk of tariff violations and hampers the ability of the ISO to revise the convergence bidding information release policy promptly based on changing market circumstances.

The information release policy was not without controversy. Some stakeholders maintained that market-sensitive or proprietary information could be inferred based on assumptions that virtual bids at a particular location would be submitted by the resource at that location.[122] The ISO disagrees with this argument as virtual bids can be submitted by any scheduling coordinator certified to submit virtual bids on behalf of a convergence bidding entity at any eligible location.

Stakeholders objecting to the ISO's convergence bidding information release policy argued that it should be in the tariff, which would also allow them to protest the proposed policy. Although the ISO strongly believes that the information can be released consistent with the existing tariff as noted above, the ISO agreed to describe the information release policy in its transmittal letter to provide the Commission with visibility on the issue.

L. Deletion of Interim Tariff Provisions Regarding Underscheduling in the Day-Ahead Market

The Commission, in its September 2006 order on the ISO's proposed new market design, "direct[ed] the CAISO to develop and file interim measures . . . to

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120 *See* "Draft Final Proposal on Data Release & Accessibility: Phase 2 Convergence Bidding Data Release" (Jan. 15, 2010), available on the ISO's website at http://www.caiso.com/271f/271f1113143b80.pdf.

121 Section 20.2 of the ISO's tariff defines what information the ISO must maintain as confidential information. Nothing in the convergence bidding information release policy fits within any of the defined categories. Further, neither the Midwest ISO nor the New York ISO appears to issue its daily market report pursuant to a tariff directive.

122 The ISO disagrees. Any entity eligible to submit virtual bids may submit bids at any location.

address the potential economic incentive for LSEs [load serving entities] to underschedule in the day-ahead market until the successful implementation of convergence bidding has been achieved."[123] The ISO developed and filed, and the Commission approved, the interim measures required by the September 2006 Order.[124] The interim measures are contained in Section 11.24 of the ISO tariff.

As explained in the September 2006 Order, the interim measures will no longer be necessary once convergence bidding is implemented. Therefore, the ISO proposes to delete Section 11.24 from the ISO tariff, effective as of the planned February 1, 2011 implementation date for convergence bidding.

M. Clean-Up Tariff Revisions

In addition to the tariff changes discussed above, the ISO proposes to make the following clean-up tariff changes to its tariff:

- The addition of a title to Section 6.5.6.1.1.
- Non-substantive clarifications and shortening of section titles in Sections 11.8.6.3, 11.8.6.5.2, 11.8.6.6, 11.22.2.5, 12.1.1.2, 12.1.3.1.1, 31.2, and 31.5.1.1.
- Renumbering and re-titling of Section 4.5.2 to reflect the addition of new tariff provisions.
- Revision of Section 12.1.3.1.1 and Appendix A to add "EAL" as an abbreviation of the defined term "estimated aggregate liability."

III. Effective Dates and Request for Waiver

The ISO requests that the Commission accept the proposed *pro forma* convergence bidding entity agreement included in this filing effective as of October 18, 2010 and grant a February 1, 2011 effective date for the balance of the tariff changes presented in this submittal. The ISO also requests that the Commission issue an order addressing the entire package of convergence bidding tariff

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[123] *California Independent System Operator Corp.*, 116 FERC ¶ 61,274, at P 452 (2006). *See also California Independent System Operator Corp.*, 124 FERC ¶ 61,043, at P 2 (2008) ("[T]he Commission directed the CAISO to develop and file interim measures to mitigate the potential economic incentives for LSEs to underschedule in the day-ahead market, which would remain in effect until superseded by the implementation of an approved convergence bidding proposal.").

[124] *See California Independent System Operator Corp.*, 124 FERC ¶ 61,043, *order on reh'g and compliance filing*, 125 FERC ¶ 61,339 (2008), *order on compliance filing*, 126 FERC ¶ 61,277 (2009); Letter Order, Docket Nos. ER06-615-041, *et al.* (July 2, 2009).

amendments in advance of the requested October 18, 2010 effective date of the *pro forma* convergence bidding entity agreement. February 1, 2011 is the date on which the Commission has authorized the ISO to implement convergence bidding.[125] A Commission order on the entire package of tariff amendments prior to the requested October 18, 2010 effective date for the *pro forma* agreement will provide the ISO and market participants that intend to take part in convergence bidding with regulatory certainty sufficiently in advance of the February 1, 2011 go-live date to allow them to participate on day one.

Finally, the ISO also respectfully requests waiver of the Commission's regulations for the tariff revisions in this filing with a February 1, 2011 effective date.[126] In light of the Commission's expectation that the ISO file tariff language to implement convergence bidding in a timely manner,[127] granting the requested effective date and waiver is warranted.

IV. Communications

Communications regarding this filing should be addressed to the following individuals, whose names should be placed on the official service list for this proceeding:

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125 Convergence Bidding Design Order at P 24.

126 Specifically, the ISO requests waiver, pursuant to Section 35.11 of the Commission's regulations (18 C.F.R. § 35.11), of the notice requirement set forth in Section 35.3 of the Commission's regulations (18 C.F.R. § 35.3).

127 Convergence Bidding Design Order at Ordering Paragraph (E).

V. Service

The ISO has served copies of this transmittal letter, and all attachments, on the California Public Utilities Commission, the California Energy Commission, all parties in Docket No. ER10-300, 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.

VI. Attachments

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

Attachment A	Revised ISO tariff sheets that incorporate the proposed changes described above
Attachment B	The proposed changes to the ISO tariff shown in black-line format
Attachment C	Declaration of Khaled Abdul-Rahman, Principal, Power Systems Technology Architecture and Development for the ISO
Attachment D	Declaration of Margaret Miller, Manager, Market Design and Regulatory Policy for the ISO
Attachment E	Declaration of Eric Hildebrandt, Director of the ISO's Department of Market Monitoring
Attachment F	Table summarizing key dates in the ISO's convergence bidding stakeholder process

VII. Conclusion

For the foregoing reasons, the Commission should accept the proposed tariff changes contained in the instant filing effective as of the dates requested by the ISO. Please contact the undersigned if you have any questions regarding this matter.

Respectfully submitted,

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Attachment A – Clean Sheets

Convergence Bidding Amendment

ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

4.5.1 Scheduling Coordinator Certification

Only Scheduling Coordinators that the CAISO has certified as having met the requirements of this Section 4.5.1 may participate in the CAISO's Energy and Ancillary Services markets. Scheduling Coordinators offering Ancillary Services shall additionally meet the requirements of Section 8.

Each Scheduling Coordinator shall:

(a) demonstrate to the CAISO's reasonable satisfaction that it is capable of performing the functions of a Scheduling Coordinator under this CAISO Tariff including (without limitation) the functions specified in Sections 4.5.3 and 4.5.4 as applicable;

(b) identify each of the Eligible Customers (including itself if it trades for its own account) which it is authorized to represent as Scheduling Coordinator and confirm that the metering requirements under Section 10 are met in relation to each Eligible Customer that it represents under this CAISO Tariff;

(c) identify each of the Convergence Bidding Entities that it is authorized to represent as Scheduling Coordinator;

(d) confirm that each of the End-Use Customers it represents is eligible for service as a Direct Access End User;

(e) confirm that none of the Wholesale Customers it represents is ineligible for wholesale transmission service pursuant to the provisions of FPA Section 212(h);

(f) demonstrate to the CAISO's reasonable satisfaction that it meets the financial criteria set out in Section 12;

(g) enter into a Scheduling Coordinator Agreement with the CAISO; and

(h) provide NERC tagging data as applicable.

4.5.1.1 Procedure to become a Scheduling Coordinator.

(a) represented Generators have entered into Participating Generator Agreements or Qualifying Facility Participating Generator Agreements as provided in Appendices B.2 and B.3, respectively with the CAISO;

(b) represented UDCs have entered into UDC Operating Agreements as provided in Appendix B.8 with the CAISO;

(c) represented CAISO Metered Entities have entered into Meter Service Agreements for CAISO Metered Entities as provided in Appendix B.6 with the CAISO;

(d) none of the Wholesale Customers it will represent are ineligible for wholesale transmission service pursuant to the provisions of the FPA Section 212(h); and

(e) each End-Use Customer it will represent is eligible for service as a Direct Access End User pursuant to an established program approved by the California Public Utilities Commission or a Local Regulatory Authority.

A Scheduling Coordinator Applicant that seeks to serve as Scheduling Coordinator for one or more Convergence Bidding Entities must certify that it is duly authorized to represent those Convergence Bidding Entities and to submit and settle Virtual Bids on their behalf.

4.5.1.1.7 Deficient Application.

In the event that the CAISO has determined that the application is deficient, the CAISO will send an electronic notification of the deficiency to the Scheduling Coordinator Applicant within ten (10) Business Days of receipt by the CAISO of the application explaining the deficiency and requesting additional information.

4.5.1.1.7.1 Scheduling Coordinator Applicant's Additional Information.

Once the CAISO requests additional information, the Scheduling Coordinator Applicant has five (5) Business Days, or such longer period as the CAISO may agree, to provide the additional material requested by the CAISO.

4.5.2 Eligible Customers and Convergence Bidding Entities

4.5.2.1 SCs Representing Eligible Customers

Each Scheduling Coordinator shall within ten (10) days of a request by the CAISO provide the CAISO with a list of the Eligible Customers that it represents at the date of the request.

4.5.2.2 SCs Representing Convergence Bidding Entities

Each Scheduling Coordinator that is or represents one or more Convergence Bidding Entities will provide the CAISO with a list of the Convergence Bidding Entities that it represents and the SCIDs that the Scheduling Coordinator will use to submit Virtual Bids for each Convergence Bidding Entity, at least eleven (11) Business Days prior to the Scheduling Coordinator's initial submission of a Virtual Bid on behalf of any of those Convergence Bidding Entities. This list must satisfy the requirements of Section 4.14.2.3. In the event that the Scheduling Coordinator will represent additional Convergence Bidding Entities or modifies any of the SCIDs that the Scheduling Coordinator will use to submit Virtual Bids on behalf of any Convergence Bidding Entity, the Scheduling Coordinator will provide the CAISO with an updated list of Convergence Bidding Entities and/or SCIDs at least eleven (11) Business Days prior to submitting a Virtual Bid involving a Convergence Bidding Entity and/or SCID not already included in the most recent list provided to the CAISO. The CAISO will incorporate the information provided pursuant to this Section 4.5.2.2 into the CAISO's official list of the Convergence Bidding Entities that Scheduling Coordinators represent and will incorporate the SCIDs that Scheduling Coordinators use to submit Virtual Bids on behalf of Convergence Bidding Entities into the Master File within eleven (11) Business Days after the CAISO determines that the information in each list or updated list provided by a Scheduling Coordinator or Convergence Bidding Entity is accurate and complete.

4.5.3 Responsibilities of a Scheduling Coordinator.

Each Scheduling Coordinator shall be responsible for:

4.5.3.1 Obligation to Pay.

Paying the CAISO's charges in accordance with this CAISO Tariff;

4.5.3.2 Submit Bids and Interchange Schedules.

4.5.3.2.1 Submitting Bids, including Self-Schedules, for Energy in CAISO Markets that relate to the Market Participants for which it serves as Scheduling Coordinator;

4.5.3.2.2 Submitting Interchange schedules prepared in accordance with all NERC, WECC and CAISO requirements, including providing E-Tags for all applicable transactions pursuant to WECC practices;

4.5.3.3 Modifications in Demand and Supply.

Coordinating and allocating modifications in Demand and exports and Generation and imports at the direction of the CAISO in accordance with this CAISO Tariff;

4.5.3.4 Inter-SC Trades.

Submitting any applicable Inter-SC Trades that the Market Participants intend to have settled through the CAISO Markets, pursuant to this CAISO Tariff;

4.5.3.5 Tracking and Settling Trades.

Tracking and settling all intermediate trades, including bilateral transactions and Inter-SC Trades, among the entities for which it serves as Scheduling Coordinator;

4.5.3.6 Ancillary Services.

Providing Ancillary Services in accordance with Section 8;

4.5.3.7 Annual and Monthly Forecasts

Submitting to the CAISO its forecasted monthly and annual peak Demand in the CAISO Balancing Authority Area and/or its forecasted monthly and annual Generation capacity, as applicable; the forecasts shall be submitted to the CAISO electronically on a monthly basis by noon of the 18th working day of the month and shall cover a period of twelve (12) months on a rolling basis. Scheduling Coordinators that represent only Convergence Bidding Entities will not be subject to the requirements of this Section 4.5.3.7.

4.5.3.8 Business Practice Manuals.

Complying with all CAISO Business Practice Manuals and ensuring compliance by each of the Market Participants which it represents with all applicable provisions of the Business Practice Manuals;

4.5.3.9 Interruptible Imports. Identifying any Interruptible Imports included in its Bids or Inter-SC Trades;

4.5.3.10 Participating Intermittent Resources.

Submitting Bids, including Self-Schedules, for Participating Intermittent Resources consistent with the CAISO Tariff;

4.5.3.11 Day-Ahead Market Published Schedules and Awards.

Starting-up units and timely achieving specified operating levels in response to Dispatch Instructions, in accordance with CAISO published Schedules and awards;

4.5.3.12 Financial Responsibility

Assuming financial responsibility for all Schedules, awards, HASP Intertie Schedules and Dispatch Instructions issued in the CAISO Markets, and all Virtual Bids, in accordance with the provisions of this CAISO Tariff; and

4.5.3.13 Compliance with Environmental Constraints, Operating Permits and Applicable Law.

Submitting Bids so that any service provided in accordance with such Bids does not violate environmental constraints, operating permits or applicable law. All submitted Bids must reflect resource limitations and other constraints as such are required to be reported to the CAISO Control Center.

4.5.4 Operations of a Scheduling Coordinator.

4.5.4.1 Maintain Twenty-four (24) Hour Scheduling Centers

Each Scheduling Coordinator other than a Scheduling Coordinator that represents only Convergence Bidding Entities shall operate and maintain a twenty-four (24) hour, seven (7) days per week, scheduling center. Each Scheduling Coordinator shall designate a senior member of staff as its scheduling center manager who shall be responsible for operational communications with the CAISO and who shall have sufficient authority to commit and bind the Scheduling Coordinator.

4.5.4.2 [NOT USED]

4.5.4.3 Dynamic Scheduling.

Scheduling Coordinators may submit Bids for imports of Energy and Ancillary Services for which associated Energy is delivered from Dynamic System Resources located outside of the CAISO Balancing Authority Area, provided that: (a) such dynamic scheduling is technically feasible and consistent with NERC and WECC reliability standards, including any requirements of the NRC, (b) all operating, technical, and business requirements for dynamic scheduling functionality, as set forth in the Dynamic Scheduling Protocol in Appendix X or posted in standards on the CAISO Website, are satisfied, (c) the Scheduling Coordinator for the Dynamic System Resource executes a Dynamic Scheduling Agreement for Scheduling Coordinators as provided in Appendix B.5 with the CAISO for the operation of dynamic scheduling functionality, and (d) all affected Host Balancing Authorities and Intermediary Balancing Authorities each execute with the CAISO an Interconnected Balancing Authority Area Operating Agreement, a Dynamic Scheduling Host Balancing Authority Operating Agreement as provided in Appendix B.9, or a special operating agreement related to the operation of dynamic functionality.

4.14 Relationship Between the CAISO and Convergence Bidding Entities

Only entities that satisfy all of the requirements specified in this Section 4.14 will be certified by the CAISO to be Convergence Bidding Entities and thus be authorized by the CAISO to submit Virtual Bids. A Convergence Bidding Entity may submit Virtual Bids only through a Scheduling Coordinator, which can be either the Convergence Bidding Entity itself or another entity that is a Scheduling Coordinator. A Convergence Bidding Entity may be represented by only one Scheduling Coordinator at any given time.

4.14.1 Procedure to Become a Convergence Bidding Entity

4.14.1.1 Convergence Bidding Entity Application

To become a Convergence Bidding Entity, a Convergence Bidding Entity applicant must submit a completed written application, as provided in the applicable form posted on the CAISO Website, to the CAISO by mail or in person.

4.14.1.2 CAISO Information

The CAISO will provide the following information, in its most current form, on the CAISO Website and, upon request by a Convergence Bidding Entity applicant, the CAISO will send the requested information by electronic mail:

(a) the Convergence Bidding Entity application form; and

(b) the CAISO Tariff and Business Practice Manuals.

4.14.1.3 Convergence Bidding Entity Applicant Submits Application

At least sixty (60) Business Days before the date on or after which the Convergence Bidding Entity applicant proposes to start submitting Virtual Bids, the Convergence Bidding Entity applicant must return a completed application form.

4.14.1.4 Notice of Receipt

Within three (3) Business Days of receiving the application, the CAISO will send written notification to the Convergence Bidding Entity applicant that it has received the application.

4.14.1.5 CAISO Review of Application

Within ten (10) Business Days after receiving an application, the CAISO will notify the Convergence Bidding Entity applicant whether the Convergence Bidding Entity applicant has submitted all necessary information as set forth in Section 4.14.1.

4.14.1.5.1 Information Requirements

The Convergence Bidding Entity applicant must submit with its application:

(a) the proposed date on or after which the Convergence Bidding Entity applicant proposes to start submitting Virtual Bids, which may not be less than sixty (60) Business Days after the date the application was filed, unless waived by the CAISO;

(b) an explanation of whether the Convergence Bidding Entity applicant is a Rated or Unrated Public/Private Corporation, a Rated or Unrated Governmental Entity, a Local Publicly Owned Electric Utility, or another type of entity, and a chart, or equivalent information, depicting the Convergence Bidding Entity applicant's corporate structure, including all parent companies of the Convergence Bidding Entity applicant, all subsidiaries of the Convergence Bidding Entity applicant, and all Affiliates of the Convergence Bidding Entity applicant that meet the requirements of Section 4.14.2.1; and

(c) the name of the Scheduling Coordinator and SCID(s) that the Convergence Bidding Entity anticipates will be used for submitting Virtual Bids on behalf of the Convergence Bidding Entity.

Additional instructions for completing the foregoing requirements will be set forth in the applicable Business Practice Manual(s) posted on the CAISO Website.

4.14.1.6 Deficient Application

In the event that the CAISO determines that the application is deficient, the CAISO will send an electronic notification of the deficiency to the Convergence Bidding Entity applicant within ten (10) Business Days of receipt by the CAISO of the application explaining the deficiency and requesting additional information.

4.14.1.6.1 Additional Information

Once the CAISO requests additional information, the Convergence Bidding Entity applicant has five (5) Business Days, or such longer period as the CAISO may agree not to exceed five (5) additional Business Days, to provide the additional material requested by the CAISO.

4.14.1.6.2 No Response from Convergence Bidding Entity Applicant

If the Convergence Bidding Entity applicant does not submit additional information within five (5) Business Days or the longer period referred to in Section 4.14.1.6.1, the application may be rejected by the CAISO.

4.14.1.7 CAISO Approval or Rejection of an Application

4.14.1.7.1 Approval or Rejection Notification

(a) If the CAISO approves the application, it will send a written notification of approval. In addition, the CAISO will provide an executable Convergence Bidding Entity Agreement.

(b) If the CAISO rejects the application, the CAISO will send an electronic notification of rejection stating one or more of the following grounds:

(i) incomplete information; or

(ii) non-compliance with any other CAISO Tariff requirements.

Upon request, the CAISO will provide guidance as to how the Convergence Bidding Entity applicant can cure the grounds for the rejection.

4.14.1.7.2 Time for Processing Application

The CAISO will make a decision whether to accept or reject the application within ten (10) Business Days of receipt of the application. If more information is requested, the CAISO will make a final decision within ten (10) Business Days of the receipt of all outstanding or additional information requested.

4.14.1.8 Convergence Bidding Entity Applicant's Response

4.14.1.8.1 Convergence Bidding Entity Applicant's Acceptance

If the CAISO accepts the application, the Convergence Bidding Entity applicant must return the partially executed Convergence Bidding Entity Agreement previously provided by the CAISO.

4.14.1.8.2 Convergence Bidding Entity Applicant's Rejection

4.14.1.8.2.1 Resubmittal

If the CAISO rejects the application, the Convergence Bidding Entity applicant may resubmit its application at any time.

4.14.1.8.2.2 Appeal

The Convergence Bidding Entity applicant may also appeal the rejection of an application by the CAISO. An appeal must be submitted within twenty (20) Business Days following the CAISO's issuance of a notification of rejection.

4.14.1.9 Final Certification

The Convergence Bidding Entity applicant will become a Convergence Bidding Entity when:

(a) its application has been accepted;

(b) it has entered into a Convergence Bidding Entity Agreement and any other applicable agreements with the CAISO; and

(c) it has fulfilled all requirements of Section 4.14.1.5.1.

The CAISO will not certify a Convergence Bidding Entity applicant as a Convergence Bidding Entity until the Convergence Bidding Entity applicant has completed all the above-referenced requirements to the CAISO's satisfaction, at least ten (10) Business Days before the commencement of service.

4.14.2 Convergence Bidding Entity's Ongoing Obligations

4.14.2.1 Affiliate Disclosure Requirements

Each Convergence Bidding Entity applicant will notify the CAISO of any Affiliate that is a Market Participant, any Affiliate that participates in an organized electricity market in North America, and any guarantor of any such Affiliate. Upon request, a Convergence Bidding Entity applicant will provide the CAISO with information on each such Affiliate, including information concerning the ownership structure of such Affiliate and the business purpose of such Affiliate. These requirements will continue to apply after a Convergence Bidding Entity applicant becomes a Convergence Bidding Entity.

4.14.2.2 Obligation to Report a Change in Filed Information

Each Convergence Bidding Entity has an ongoing obligation to inform the CAISO of any changes to any of the information submitted by it to the CAISO as part of the application process, including but not limited to any changes to such information after the application is initially submitted, any changes to the additional information requested by the CAISO, and changes regarding its Affiliates that satisfy the requirements of Section 4.14.2.1, within five (5) Business Days of when each such change occurs. The applicable Business Practice Manual sets forth the procedures for changing the Convergence Bidding Entity's information.

4.14.2.3 Identification of SCIDs

Each Convergence Bidding Entity will provide the CAISO with a list of the SCIDs that the Scheduling Coordinator that represents the Convergence Bidding Entity will use to submit Virtual Bids for that Convergence Bidding Entity, at least eleven (11) Business Days prior to the Scheduling Coordinator's submission of a Virtual Bid on behalf of the Convergence Bidding Entity. If there is a subsequent change to the list of the SCIDs that the Scheduling Coordinator will use to submit Virtual Bids on behalf of the Convergence Bidding Entity or the identity of the Scheduling Coordinator that represents the Convergence Bidding Entity, the Convergence Bidding Entity will provide the CAISO with an updated list of SCIDs that the Scheduling Coordinator that represents the Convergence Bidding Entity will use to submit Virtual Bids on behalf of the Convergence Bidding Entity, at least eleven (11) Business Days prior to the Scheduling Coordinator's submittal of a Virtual Bid involving a Convergence Bidding Entity and/or SCID not already included in the most recent list provided to the CAISO. The identification of the Scheduling Coordinator and list of SCIDs provided by the Convergence Bidding Entity and the list of SCIDs provided by the Scheduling Coordinator regarding that Convergence Bidding Entity pursuant to Section 4.5.2.2 must correspond. In the event these lists do not correspond, the CAISO will inform the applicable Scheduling Coordinator and Convergence Bidding Entity, and the parties will provide revised lists that correspond prior to the Scheduling Coordinator's submission of a Virtual Bid on behalf of that Convergence Bidding Entity. The CAISO will incorporate the information provided pursuant to this Section 4.14.2.3 into the CAISO's official list of the Scheduling Coordinators that are eligible to submit Virtual Bids on behalf of Convergence Bidding Entities and the SCIDs used on their behalf will be incorporated into the Master File within eleven (11) Business Days after the CAISO determines that the information in each list, updated list, or revised list provided by a Scheduling Coordinator or Convergence Bidding Entity is accurate and complete.

4.14.2.4 Failure to Promptly Report a Material Change

If a Convergence Bidding Entity fails to inform the CAISO of a material change in its information provided to the CAISO, the CAISO may limit, suspend, or terminate the Convergence Bidding Entity's rights under the CAISO Tariff and terminate the Convergence Bidding Entity Agreement in accordance with the terms of Sections 4.14.3, 12, and 39.11.2. If the CAISO intends to terminate the Convergence Bidding Entity Agreement, it will file a notice of termination with FERC, if required by FERC rules, in accordance with the terms of the Convergence Bidding Entity Agreement. Such termination will be effective upon acceptance by FERC of a notice of termination, if required by FERC rules, or as otherwise permitted by FERC rules.

4.14.3 Termination of a Convergence Bidding Entity Agreement

(a) A Convergence Bidding Entity Agreement may be terminated by the CAISO on written notice to the Convergence Bidding Entity in accordance with the terms of the Convergence Bidding Entity Agreement:

(i) if the Convergence Bidding Entity no longer meets the requirements for eligibility set out in Section 4.14and fails to remedy the default within a period of seven (7) Business Days after the CAISO has given written notice of the default;

(ii) if the Scheduling Coordinator that represents the Convergence Bidding Entity fails to pay any sum under this CAISO Tariff and fails to remedy the default within a period of five (5) Business Days after the CAISO has given written notice of the default; or

(iii) if the Convergence Bidding Entity commits any other default under this CAISO Tariff or any of the Business Practice Manuals which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given it written notice of the default.

(b) The Convergence Bidding Entity may terminate the Convergence Bidding Entity Agreement in accordance with the provisions of that agreement.

(c) Upon termination of the Convergence Bidding Entity Agreement, the Scheduling Coordinator that represents the Convergence Bidding Entity will continue to be liable for any outstanding financial or other obligations incurred under the CAISO Tariff as a result of the Convergence Bidding Entity's status as a Convergence Bidding Entity.

(d) The CAISO will, following termination of a Convergence Bidding Entity Agreement and within thirty (30) days of being satisfied that no sums remain owing by the Scheduling Coordinator that represents the Convergence Bidding Entity under the CAISO Tariff, return or release to the Scheduling Coordinator, as appropriate, any Financial Security support provided by such Scheduling Coordinator to the CAISO under Section 12.

5. [NOT USED]

6.2.1.5 Confidentiality.

All information posted on the CAISO's secure communication system shall be subject to the confidentiality obligations contained in Section 20.

6.2.1.6 Standards of Conduct.

The CAISO and all Market Participants shall comply with their obligations, to the extent applicable, under the standards of conduct set out in 18 C.F.R. §37.

6.2.2 Public Market Information.

6.2.2.1 Non-Discriminatory Access to Information.

The CAISO shall provide non-discriminatory access to information concerning the status of the CAISO Controlled Grid or facilities that affect the CAISO Controlled Grid by posting that information on the CAISO Website, or other similar computer communications device, or by telephone or facsimile in the event of computer systems failure.

6.2.2.2 Open Access Same-Time Information System.

The CAISO shall provide a public access information reporting system, Open Access Same-Time Information System (OASIS), to deliver market operations and grid management information to accommodate users other than Market Participants. OASIS will be accessible to the public via a link on the CAISO Website.

6.5.2.3.6 Virtual Bid Reference Prices

The CAISO will publish Virtual Bid Reference Prices prior to the applicable reference period for the Virtual Bid Reference Prices**.**

6.3 Communication of Dispatch Instructions.

Normal verbal and electronic communication of Dispatch Instructions between the CAISO and Generators or Participating Loads will be via the relevant Scheduling Coordinator.

6.3.1 Scheduling Coordinator Responsibility to Pass Dispatch Instructions to Participating Generator or Load.

Each Scheduling Coordinator must immediately pass on to the Generator or Participating Load concerned any communication for the Generator or Participating Load which it receives from the CAISO.

6.5.6 Market Bid Information.

6.5.6.1 Public Market Information

6.5.6.1.1 180 Days After Trading Day

The following information shall be published on OASIS 180 days following the applicable Trading Day, with the exclusion of the information that is specific to Scheduling Coordinators:

(a) AS market Bids;

(b) Energy market Bids, including Virtual Bids separately identified as such; and

(c) RUC market Bids.

6.5.6.1.2 Within seven (7) days after the Trading Day, the CAISO will publish via OASIS all Start-Up Costs and Minimum Load Costs for CAISO committed resources.

7.7.15 System Operations in the Event of a Market Disruption

7.7.15.1 Actions in the Event of a Market Disruption, to Prevent a Market Disruption or to minimize the Extent of a Market Disruption

The CAISO may take one or more of the following actions in the event of a Market Disruption, to prevent a Market Disruption, or to minimize the extent of a Market Disruption:

(a) postpone the closure of the applicable CAISO Market;

(b) remove Bids, including Self-Schedules, that have resulted in a Market Disruption previously;

(c) close the applicable CAISO Market and manually copy Bids, including Self-Schedules, from the previous day or other applicable market period;

(d) close the applicable CAISO Market and use submitted Bids, including Self-Schedules, to the extent possible;

(e) cancel the applicable CAISO Market, in which case import/export schedules shall be determined by submittal of E-Tags;

(f) utilize Administrative Prices to settle metered Supply and Demand;

(g) utilize Exceptional Dispatch and issue operating orders for resources to be committed and dispatched to meet Demand; and

(h) suspend or limit the ability of all Scheduling Coordinators to submit Virtual Bids on behalf of Convergence Bidding Entities at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes.

(d) The CAISO shall calculate, account for and settle all charges and payments based on the Settlement Quality Meter Data it has received, or, if Settlement Quality Meter Data is not available, based on the best available information or estimate it has received in accordance with the provisions in Section 10 and the applicable Business Practice Manuals; and

(e) Day-Ahead Schedules, RUC Awards and AS Awards shall be settled at the relevant LMP, RUC Price, and ASMPs, respectively. HASP Intertie Schedules shall be settled at the relevant HASP Intertie LMP at the relevant Scheduling Point. All Dispatch Instructions shall be deemed delivered and settled at relevant Real-Time Market prices. Deviations from Dispatch Instructions shall be settled as Uninstructed Deviations.

11.1.1 [NOT USED]

11.1.2 Settlement Charges and Payments

The CAISO shall settle the following charges in accordance with this CAISO Tariff: (1) Grid Management Charge; (2) Bid Cost Recovery; (3) IFM charges and payments, including Energy and Ancillary Services; (4) RUC charges and payments; (5) Real-Time Market charges and payments, including Energy and Ancillary Services; (6) HASP charges and payments for Energy; (7) High Voltage Access Charges and TAC Transition Charges; (8) Wheeling Access Charges; (9) Voltage Support and Black Start charges; (10) Excess Cost Payments; (11) default interest charges; (12) CRR Charges and Payments, (13) Inter-SC Trades charges and payments; (14) neutrality adjustments; (15) FERC Annual Charges; (16) distribution of excess Marginal Losses; (17) Virtual Bid Submission Charges; (18) miscellaneous charges and payments; and (19) Participating Intermittent Resource Fees.

11.2.4.1 Calculation of the IFM Congestion Charge

For each Settlement Period of the IFM, the CAISO shall calculate the IFM Congestion Charge as the IFM MCC amount for all scheduled Demand and Virtual Demand Awards minus the IFM MCC amount for all scheduled Supply and Virtual Demand Awards. The IFM MCC amount for all scheduled Demand and Virtual Demand Awards is the sum of the products of the IFM MCC and the total of the MWh of Demand scheduled in the Day-Ahead Schedule and Virtual Demand Awards at all the applicable PNodes, Scheduling Points and Aggregated Pricing Nodes for the Settlement Period. The IFM MCC amount for all scheduled Supply and Virtual Demand Awards is the sum of the products of the IFM MCC and the total of the MWh of Supply scheduled in the Day-Ahead Schedule and the Virtual Supply Awards at all the applicable PNodes and Scheduling Points for the Settlement Period.

11.2.4.1.2 Calculation of IFM Congestion Fund.

For each Settlement Period of the IFM, the CAISO shall determine the IFM Congestion Fund, which shall consist of the funds available to pay CRR Holders in any Settlement Period as follows:

(a) The CAISO shall add to the IFM Congestion Fund the IFM Congestion Charge computed as described in Section 11.2.4.1, minus any IFM Congestion Credits as specified in Section 11.2.1.5;

(b) The CAISO shall add to the IFM Congestion Fund any CRR Charges calculated pursuant to Sections 11.2.4.2.2 and 11.2.4.2.3; and

(c) The CAISO shall add to the IFM Congestion Fund any IFM Congestion Charges associated with Day-Ahead Ancillary Services Awards as provided in Section 11.10.1.1.1.

11.2.4.5 CRR Balancing Account.

The CRR Balancing Account shall accumulate: (1) the seasonal and monthly CRR Auction revenue amounts that were converted into daily CRRBA values as described in Section 11.2.4.3, (2) any surplus revenue or shortfall generated from hourly CRR Settlements as described in Section 11.2.4.4, and (3) any adjustments of CRR revenue due to virtual bidding or Intertie scheduling practices as described in Section 11.2.4.6. Interest accruing due to the CRR Balancing Account shall be at the CAISO's received interest rate and shall be credited to each monthly CRRBA Accrued Interest Fund, which is then allocated to monthly Measured Demand excluding Measured Demand associated with valid and balanced ETC, TOR, or CVR self-schedule quantities for which IFM Congestion Credits and/or RTM Congestion Credits were provided in the same month.

11.2.4.6 Adjustment of CRR Revenue

The CAISO will adjust the revenue from the CRRs of a CRR Holder that is also a Convergence Bidding Entity, and will adjust the revenue from the CRRs of a CRR Holder (regardless of whether the CRR Holder is also a Convergence Bidding Entity) where the Scheduling Coordinator representing that CRR Holder has reduced a Day-Ahead import or export Schedule in the HASP as set forth in Section 11.32, whenever the virtual bidding activity on behalf of that entity or a reduction to a Day-Ahead import or export Schedule in the HASP has had a significant impact on the value of the CRRs in the DAM as determined in accordance with the following steps.

(a) For purposes of this Section 11.2.4.6 and the definition of Flow Impact, any reduction by a Scheduling Coordinator submitting Schedules on behalf of an entity that is a CRR Holder to an import or export Schedule in the HASP will be treated as a Virtual Award. For each CRR Holder subject to this Section 11.2.4.6, for each hour, and for each Constraint binding in the IFM, HASP, or RTD, the CAISO will calculate the Flow Impact of the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder, excluding Virtual Awards at LAPs and generation Trading Hubs.

(b) The CAISO will determine the peak and off-peak hours of the day in which Congestion on the Constraint was significantly impacted by the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder. Congestion on the Constraint will be deemed to have been significantly impacted by the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder if the Flow Impact passes two criteria. First, the Flow Impact must be in the direction to increase the value of the CRR Holder's CRR portfolio. Second, the Flow Impact must exceed the configurable threshold percentage of the flow limit for the Constraint. The threshold percentage will initially be set at ten (10) percent of the flow limit for each Constraint. The threshold percentage may be changed as provided in the Business Practice Manual. An increase in the threshold percentage for any Constraint must be based on evidence (from simulations of market re-runs or other appropriate analytical tool) that a Flow Impact greater than the current threshold percentage should not be expected to have a significant impact on the Constraint's Shadow Price. A decrease in the threshold percentage for any Constraint must be based on evidence (from simulations of market re-runs or other appropriate analytical tool) that a Flow Impact less than the current threshold percentage should not be expected to have a significant impact on the Constraint's Shadow Price. DMM will notify FERC of a change in any Constraint's threshold percentage in a quarterly report covering the date of the change in threshold percentage on a quarterly basis in the event of any change in threshold percentage during that quarter.

(c) For each peak or off-peak hour that passes both criteria in Section 11.2.4.6(b), the CAISO will compare the Constraint's impact on the Day-Ahead Market value of the CRR Holder's CRR portfolio with the Constraint's impact on the HASP or Real-Time Market value of the CRR Holder's CRR portfolio, as applicable.

(d) The CAISO will adjust the peak or off-peak period revenue from the CRR Holder's CRRs in the event that, over the peak or off-peak period of a day, the Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Constraint's contribution to the HASP or Real-Time Market value of the CRR Holder's CRR portfolio, as applicable. The amount of the peak period adjustment will be the amount by which the Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Constraint's contribution to the HASP or Real-Time Market value of the CRR Holder's CRR portfolio for the peak-period hours that passed both criteria in Section 11.2.4.6(b), as applicable. The amount of the off-peak period adjustment will be the amount by which the Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Constraint's contribution to the HASP or Real-Time Market value of the CRR Holder's CRR portfolio for the off-peak period hours that passed both criteria in Section 11.2.4.6(b), as applicable.

All adjustments of CRR revenue calculated pursuant to this Section 11.2.4.6 will be added to the CRR Balancing Account.

11.2.5.4 Treatment of Prepaid WAC Amounts.

For the amount of CRRs that were allocated to the entity, the CAISO will exempt the Scheduling Coordinator for such entity from the WAC for any Real-Time Interchange Export Schedules at the Scheduling Point corresponding to the sink of each allocated CRR, on an hourly basis for the period for which the CRR is defined, until the pre-paid funds are exhausted. At the end of the period for which the CRR is defined any remaining balance will be allocated to the Participating TOs in accordance with Section 26.1.4.3. To the extent the pre-paid balance amount is exhausted prior to the end of the duration of the awarded CRR, the Scheduling Coordinator designated by the CRR Holder that has been allocated CRRs pursuant to Section 36.9 will be charged for the WAC in accordance with Section 26.1.4.

11.3 Settlement of Virtual Awards

11.3.1 Virtual Supply Awards

The CAISO will pay each Scheduling Coordinator with Virtual Supply Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the Day-Ahead LMP at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Supply Awards. Virtual Supply Awards subject to price correction will be settled as specified in Section 11.21. The CAISO will charge each Scheduling Coordinator with Virtual Supply Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the simple hourly average of the Dispatch Interval Real-Time LMPs at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Supply Awards. The CAISO will charge each Scheduling Coordinator with Virtual Supply Awards at an Intertie an amount equal to the simple hourly average of the fifteen (15) minute HASP Intertie LMPs multiplied by the MWhs of Virtual Supply Awards.

11.3.2 Virtual Demand Awards

The CAISO will charge each Scheduling Coordinator with Virtual Demand Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the Day-Ahead Market LMP at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Demand Awards. Virtual Demand Awards subject to price correction will be settled as specified in Section 11.21. The CAISO will pay each Scheduling Coordinator with Virtual Demand Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the simple hourly average of the Dispatch Interval Real-Time LMPs at the Eligible PNode or Eligible Aggregated PNode multiplied by the IFM MWhs of Virtual Demand Awards. The CAISO will pay each Scheduling Coordinator with Virtual Demand Awards at an Intertie an amount equal to the simple hourly average of the fifteen (15) minute HASP Intertie LMPs multiplied by the Day-Ahead MWhs of Virtual Demand Awards.

11.4 HASP Settlement of Scheduling Points.

The CAISO shall settle both incremental and decremental Energy at the relevant Scheduling Points including Operational Adjustments for all Non-Dynamic System Resources based on the HASP Intertie LMP in accordance with Section 11.4.1 and 11.4.2. Energy dispatched using HASP Intertie Schedules is accounted as Instructed Imbalance Energy and its costs shall be included in the Real-Time Market Settlements in accordance with Section 11.5.

11.4.1 HASP Settlement for Exports.

For each Settlement Period that the CAISO clears Energy transactions at Scheduling Points in HASP, the Settlement for such transactions will be the CAISO HASP Intertie LMP multiplied by the MWh quantity of export scheduled at the individual Scheduling Point in excess of or less than the Day-Ahead Schedule, respectively. For Scheduling Coordinators whose exports scheduled at the individual Scheduling Point is subject to an upward price correction as specified in Section 11.21, the CAISO will use the Price Correction Derived LMP to settle the MWh quantity of Energy exports scheduled in excess of the Day-Ahead Schedule at the relevant Scheduling Point.

11.5.4 Pricing for Imbalance Energy and Allocation of Non-Zero Amounts of the Sum of IIE, UIE and UFE.

11.5.4.1 Application and Calculation of Dispatch Interval LMPs.

Payments to Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that have elected gross Settlement, that supply Imbalance Energy will be based on Resource-Specific Settlement Interval LMPs. The Resource-Specific Settlement Interval LMPs are established using Dispatch Interval LMPs. Dispatch Interval LMPs will apply to Generating Units, System Units for MSS Operators that have elected gross Settlement, Physical Scheduling Plants, Dynamic System Resources, and the Demand response portion of a Participating Load for Settlement of Imbalance Energy. The Dispatch Interval LMP will be calculated at each PNode associated with such resource irrespective of whether the resource at that PNode has received Dispatch Instructions. The Dispatch Interval LMPs are then used to calculate a Resource-Specific Settlement Interval LMP and a Resource Specific Tier 1 UIE Settlement Interval Price for each Generating Unit, System Unit or MSS Operator that has elected gross Settlement, Physical Scheduling Plant, Dynamic System Resource, and Participating Load within the CAISO Controlled Grid. Payments to Scheduling Coordinators for MSS Operators that have elected net Settlement that supply Imbalance Energy will be based on the Real-Time Settlement Interval MSS Price.

11.5.4.2 Allocations of Non-Zero Amounts of the Sum of IIE, UIE, UFE, the Real-Time Ancillary Services Congestion Revenues and Real-Time Virtual Awards Settlements

The CAISO will first compute (1) the Real-Time Congestion Offset and allocate it to all Scheduling Coordinators, based on Measured Demand, excluding Demand associated with ETC or TOR Self-Schedules for which a HASP and RTM Congestion Credit was provided as specified in Section 11.5.7, and excluding Demand associated with ETC, Converted Right, or TOR Self-Schedules for which an IFM Congestion Credit was provided as specified in Section 11.2.1.5; and (2) the Real-Time Marginal Cost of Losses Offset and allocate it to all Scheduling Coordinators based on Measured Demand, excluding Demand associated with TOR Self-Schedules for which a RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules was provided as specified in Section

11.5.7.2, and excluding Demand associated with TOR Self-Schedules for which an IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules was provided as specified in Section 11.2.1.7. For Scheduling Coordinators for MSS operators that have elected to Load follow or net settlement, or both, the Real-Time Marginal Cost of Losses Offset will be allocated based on their MSS Aggregation Net Measured Demand excluding Demand associated with TOR Self-Schedules for which a RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules was provided as specified in Section 11.5.7.2, and excluding Demand associated with TOR Self-Schedules for which an IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules was provided as specified in Section 11.2.1.7. For Scheduling Coordinators for MSS Operators regardless of whether the MSS Operator has elected gross or net Settlement, the CAISO will allocate the Real-Time Congestion Offset based on the MSS Aggregation Net Non-ETC/TOR Measured Demand. To the extent that the sum of the Settlement amounts for IIE, UIE, UFE, the Real-Time Ancillary Services Congestion revenues and Virtual Awards settlements in the HASP and Real-Time Market in accordance with Section 11.3, less Real-Time Congestion Offset, and less the Real-Time Marginal Cost of Losses Offset, does not equal zero, the CAISO will assess charges or make payments for the resulting differences to all Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that are not Load following MSSs and have elected gross Settlement, based on a pro rata share of their Measured Demand for the relevant Settlement Interval. For Scheduling Coordinators for MSS Operators that have elected net Settlement, the CAISO will assess charges or make payments for the resulting non-zero differences of the sum of the Settlement amounts for IIE, UIE, and UFE, the Real-Time Ancillary Services Congestion Revenues and Virtual Awards settlements in the HASP and Real-Time Market in accordance with Section 11.3, less Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset, based on their MSS Aggregation Net Measured Demand. For Scheduling Coordinators for MSS Operators that have elected Load following, the CAISO will not assess any charges or make payments for the resulting non-zero differences of the sum of the Settlement amounts for IIE, UIE, and UFE, the Real-Time Ancillary Services Congestion Revenues and Virtual Awards settlements in the HASP and Real-Time Market in accordance with Section 11.3, less Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset.

11.8 Bid Cost Recovery

For purposes of determining the Unrecovered Bid Cost Uplift Payments for each Bid Cost Recovery Eligible Resource as determined in Section 11.8.5 and the allocation of Unrecovered Bid Cost Uplift Payments for each Settlement Interval, the CAISO shall sequentially calculate the Bid Costs, which can be positive (IFM, RUC or RTM Bid Cost Shortfall) or negative (IFM, RUC or RTM Bid Cost Surplus) in the IFM, RUC and the Real-Time Market, as the algebraic difference between the respective IFM, RUC or RTM Bid Cost and the IFM, RUC or RTM Market Revenues, which is netted across the CAISO Markets. In any Settlement Interval a resource is eligible for Bid Cost Recovery payments only if it is On, or in the case of a Participating Load, only if the resource has actually stopped or started consuming pursuant to the Dispatch Instruction. BCR Eligible Resources for different MSS Operators are supply resources listed in the applicable MSS Agreement. All Bid Costs shall be based on mitigated Bids as specified in Section 39.7. Virtual Awards are not eligible for Bid Cost Recovery. Virtual Awards are eligible for make-whole payments due to price corrections pursuant to Section 11. 21.2. In order to be eligible for Bid Cost Recovery, Non-Dynamic Resource-Specific System Resources must provide to the CAISO SCADA data by telemetry to the CAISO's EMS in accordance with Section 4.12.3 demonstrating that they have performed in accordance with their CAISO commitments.

11.8.1 CAISO Determination of Self-Commitment Periods.

For the purposes of identifying the periods during which a Bid Cost Recovery Eligible Resource is deemed self-committed and thus ineligible for Start-Up Costs, Minimum Load Costs, IFM Pump Shut-Down Costs and IFM Pumping Costs, the CAISO derives the Self-Commitment Periods as described below. MSS resources designated for Load following are considered to be self-committed if they have been scheduled with non-zero Load following capacity, or are otherwise used to follow Load in the Real-Time. The IFM and RUC Self-Commitment Periods will be available as part of the Day-Ahead Market results provided to the applicable Scheduling Coordinator. The interim RTM Self-Commitment Periods as reflected in the HASP will be available as part of the HASP results for the relevant Trading Hour as provided to the applicable Scheduling Coordinator. The final RTM Self-Commitment Period is determined ex-post for Settlements purposes. ELS Resources committed through the ELC Process described in

11.8.2.3.2 MSS Elected Net Settlement.

For an MSS Operator that has elected net Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the Energy affected by IFM Bid Cost Recovery is the MSS level net Energy where the MSS Supply exceeds the MSS Demand within the MSS. The IFM Bid Cost Shortfall or Surplus is also settled at the MSS level as opposed to the individual resource level. The IFM Bid Cost as described in Section 11.8.2.1 above and IFM Market Revenue as provided in Section 11.8.2.2 above, of each MSS will be, respectively, the total of the IFM Bid Costs and IFM Market Revenues of all BCR Eligible Resources within the MSS. The IFM Bid Cost Shortfalls and Surpluses for Energy and AS are first calculated separately for the MSS for each Trading Hour of the Trading Day with qualified Start-Up Cost and qualified Minimum Load Cost included in the IFM Bid Cost Shortfalls and Surpluses for Energy calculation. The IFM Bid Cost Shortfall or Surplus of Energy in each Trading Hour is then pro-rated by the MSS's ratio of the net positive MSS Generation Schedule to the gross MSS Generation Schedule of that Trading Hour. If the MSS CAISO Demand is in excess of the MSS Generation in a given Trading Hour in the Day-Ahead Schedule, the CAISO will set the pro-rating ratio for that Trading Hour to zero. The MSS's overall IFM Bid Cost Shortfall or Surplus is then calculated as the algebraic sum of the pro-rated IFM Bid Cost Shortfall or Surplus for Energy and the IFM Bid Cost Shortfall or Surplus for AS for each Trading Hour.

11.8.3 RUC Bid Cost Recovery Amount

For purposes of determining the RUC Unrecovered Bid Cost Uplift Payments as determined in Section 11.8.5 and for the purposes of allocating Net RUC Bid Cost Uplift as described in Section 11.8.6.5, the CAISO shall calculate the RUC Bid Cost Shortfall or the RUC Bid Cost Surplus as the algebraic difference between the RUC Bid Cost and the RUC Market Revenues for each Bid Cost Recovery Eligible Resource for each Settlement Interval. The RUC Bid Costs shall be calculated pursuant to Section 11.8.3.1 and the RUC Market Revenues shall be calculated pursuant to Section 11.8.3.2. Bid Cost Recovery costs related to Short Start Units committed in Real-Time as a result of awarded RUC Capacity will be included in RUC Compensation Costs.

11.8.6.3 Determination of Total Positive CAISO Markets Uplifts

Any negative IFM, RUC or Real-Time Market Bid Cost Uplifts are set to $0 and any positive Net IFM Bid Cost Uplifts, RUC Bid Cost Uplifts, or Real-Time Market Bid Cost Uplifts are further reduced by the uplift ratio in Section 11.8.6.3(iii) to determine the Total CAISO Markets Uplift as follows;

(i) The Total CAISO Markets Uplift is determined as the sum of the Net IFM Bid Cost Uplift, the Net RUC Bid Cost Uplift, and the Net Real-Time Market Bid Cost Uplift, for all Settlement Intervals in the IFM, RUC and Real-Time Market.

(ii) The Total Positive CAISO Market Uplift, is determined as the sum of the positive IFM Bid Cost Uplift, positive RUC Bid Cost Uplift and positive Real-Time Market Bid Cost Uplift, for all Settlement Intervals in the IFM, RUC and Real-Time Market.

(iii) The uplift ratio is equal to the Total CAISO Markets Uplift divided by the Total Positive CAISO Market Uplift.

11.8.6.4 Allocation of Net IFM Bid Cost Uplift

For each Trading Hour of the IFM, the hourly Net IFM Bid Cost Uplift is determined as the sum over the Settlement Intervals in that Trading Hour of the product of any positive Net IFM Bid Cost Uplift remaining in the Settlement Interval after the sequential netting in Section 11.8.6.2 and the application of the uplift ratio as determined in 11.8.6.3.

11.8.6.4.1 Allocation in the First Tier

The hourly Net IFM Bid Cost Uplift is allocated in the first tier as follows:

(i) The hourly amount of Net IFM Bid Cost Uplift allocated to each Scheduling Coordinator is equal to the product of the IFM Bid Cost Uplift rate and the IFM uplift obligation for the Scheduling Coordinator.

(ii) The IFM Bid Cost Uplift rate is equal to the Net IFM Bid Cost Uplift divided by the sum of the positive IFM Load Uplift Obligations for all Scheduling Coordinators and the IFM system-wide Virtual Demand Award uplift obligation, subject to the condition that the IFM Bid Cost Uplift rate cannot exceed the ratio of the hourly Net IFM Bid Cost Uplift for the Trading Hour divided by the maximum of (a) the sum of all hourly IFM Load Uplift Obligations for all Scheduling Coordinators in that Trading Hour or (b) the sum of all hourly Generation scheduled in the Day-Ahead Schedule and IFM upward AS Awards for all Scheduling Coordinators from CAISO-committed Bid Cost Recovery Eligible Resources in that Trading Hour.

(iii) The IFM uplift obligation for each Scheduling Coordinator is equal to the sum of the IFM Load Uplift Obligation for the Scheduling Coordinator and any IFM Virtual Demand Award uplift obligation for the Scheduling Coordinator.

(iv) The IFM Load Uplift Obligation for each Scheduling Coordinator, including Scheduling Coordinators for Metered Subsystems regardless of their MSS optional elections (net/gross Settlement, Load following, RUC opt-in/out), is equal to the positive difference between the total Demand scheduled in the Day-Ahead Schedule of that Scheduling Coordinator and the sum of scheduled Generation and scheduled imports from the Self-Schedules in the Day-Ahead Schedule of that Scheduling Coordinator, adjusted by any applicable Inter-SC Trades of IFM Load Uplift Obligations.

(v) The IFM system-wide Virtual Demand Award uplift obligation is calculated for each hour in the IFM and is equal to maximum of zero (0) or the following quantity: the total system-wide Virtual Demand Awards from the IFM minus the total system-wide Virtual Supply Awards from the IFM, plus the minimum of zero (0) or the following quantity: the total amount of Scheduled Demand (which excludes Virtual Demand Awards), minus net Virtual Demand Awards minus Measured Demand.

(vi) For each Scheduling Coordinator with positive net Virtual Demand Awards, the IFM Virtual Demand Award uplift obligation is equal to the product of (a) the positive net Virtual Demand Awards for the Scheduling Coordinator divided by the sum of each Scheduling Coordinator's positive net Virtual Demand Award and (b) the IFM system-wide Virtual Demand Award uplift obligation. For each Scheduling Coordinator with negative net Virtual Demand Awards, the IFM Virtual Demand Award uplift obligation is zero (0).

11.8.6.4.2 Allocation in the Second Tier

In the second tier, Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that have elected both to not follow their Load and gross Settlement, will be charged for an amount equal to any remaining hourly Net IFM Bid Cost Uplift for the Trading Hour in proportion to the Scheduling Coordinator's Measured Demand. Scheduling Coordinators for MSS Operators that have elected to either follow their Load or net Settlement, or both, will be charged for an amount equal to any remaining hourly Net IFM Bid Cost Uplift for the Trading Hour in proportion to their MSS Aggregation Net Measured Demand.

11.8.6.5 Allocation of RUC Compensation Costs.

11.8.6.5.1 Calculation of RUC Compensation Costs.

For each Trading Hour of the RUC, the CAISO shall calculate the RUC Compensation Costs as the sum of the RUC Availability Payment and the hourly Net RUC Bid Cost Uplift.

11.8.6.5.2 Calculation of the Hourly Net RUC Bid Cost Uplift

For each Trading Hour of the RUC, the hourly Net RUC Bid Cost Uplift is determined as the sum over the Settlement Intervals in that Trading Hour of the product of any positive Net RUC Bid Cost Uplift remaining in the Settlement Interval after the sequential netting in Section 11.8.6.2 and the application of the uplift ratio as determined in Section 11.8.6.3. Consistent with Section 31.5.2.2, Scheduling Coordinators for MSS Operators that have opted out of RUC participation, or opt-out of RUC by default as a result of having elected to Load follow, will not be subject to any RUC Bid Cost Uplift allocation. Scheduling Coordinators for MSS Operators that have opted-into RUC, and consequently also are non-Load following and under gross Settlement, will receive the allocation of hourly Net RUC Bid Cost Uplift like all other Scheduling Coordinators.

11.8.6.5.3 Allocation of the RUC Compensation Costs

11.8.6.5.3.1 Allocation in the First Tier

Hourly RUC Compensation Costs are allocated in the first tier as follows:

(i) The amount of RUC Compensation Costs allocated to each Scheduling Coordinator is equal to the product of the RUC Bid Cost Uplift rate and the RUC obligation for the Scheduling Coordinator. Participating Load will not be subject to the first-tier allocation of RUC Compensation Costs to the extent that the Participating Load's Net Negative CAISO Demand Deviation in that Trading Hour is incurred pursuant to a CAISO directive to consume in a Dispatch Instruction.

(ii) The RUC Bid Cost Uplift rate is equal to the lower of (a) the RUC Compensation Costs to meet Measured Demand divided by the sum of each Scheduling Coordinator's Net Negative CAISO Demand Deviation and any positive net system-wide Virtual Supply Awards in that Trading Hour, or (b) the RUC Bid Cost Uplift divided by the RUC Capacity, for all Scheduling Coordinators in that Trading Hour.

(iii) The RUC obligation for each Scheduling Coordinator is equal to the sum of the Net Negative CAISO Demand Deviation for the Scheduling Coordinator in that Trading Hour and any RUC Bid Cost obligation for Virtual Supply Awards for the Scheduling Coordinator.

(iv) The RUC Compensation Costs to meet Measured Demand are equal to the RUC Bid Cost Uplift minus the excess load share, where the excess load share is equal to the product of (a) the RUC Bid Cost Uplift divided by total RUC Capacity and (b) the maximum of zero (0) or the excess of the CAISO Demand Forecast over Measured Demand.

(v) For each Scheduling Coordinator with positive net Virtual Supply Awards, the RUC Bid Cost obligation for Virtual Supply Awards is equal to the product of (a) the positive net Virtual Supply Awards for the Scheduling Coordinator divided by the sum of each Scheduling Coordinator's positive net Virtual Supply Awards and (b) any positive net system-wide Virtual Supply Awards. For each Scheduling Coordinator with non-positive net Virtual Supply Awards, the RUC Bid Cost obligation for Virtual Supply Awards is zero (0).

11.8.6.5.3.2 Allocation in the Second Tier

In the second tier, the Scheduling Coordinator shall be charged an amount equal to any remaining RUC Compensation Costs in proportion to the Scheduling Coordinator's metered CAISO Demand in any Trading Hour, including any RUC Compensation Costs that were not recovered in the first tier pursuant to Section 11.8.6.5.3.1.

11.8.6.6 Allocation of Net RTM Bid Cost Uplift

The hourly Net RTM Bid Cost Uplift is computed for the Trading Hour as the product of the uplift ratio in Section 11.8.6.3 and the sum over all Settlement Intervals of the Trading Hour of any positive Net RTM Bid Cost Uplift after the sequential netting in Section 11.8.6.2. The hourly RTM Bid Cost Uplift is allocated to Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that have elected (a) not to follow their Load, and (b) gross Settlement, in proportion to their Measured Demand for the Trading Hour. For Scheduling Coordinators for MSS Operators that have elected (a) not to follow their Load, and (b) net Settlement, the hourly RTM Bid Cost Uplift is allocated in proportion to their MSS Aggregation Net Measured Demand. For Scheduling Coordinators of MSS Operators that have elected to follow their Load, the RTM Bid Cost Uplift shall be allocated in proportion to their MSS Net Negative Uninstructed Deviation plus any HASP reductions not associated with ETCs, TORs or Converted Rights. Accordingly, each Scheduling Coordinator shall be charged an amount equal to its Measured Demand times the RTM Bid Cost Uplift rate, where the RTM Bid Cost Uplift rate is computed as the Net RTM Bid Cost Uplift amount divided by the sum of Measured Demand across all Scheduling Coordinators for the Trading Hour.

11.9 Inter-SC Trades.

11.9.1 Physical Trades.

Inter-SC Trades of Energy in the Day-Ahead Market will be settled separately from Inter-SC Trades of Energy in the HASP. Both the Day-Ahead and HASP Inter-SC Trades of Energy will be settled on an hourly basis and the two respective Settlement amounts between the two parties for each market shall net to zero. All MWh quantities of Physical Trades submitted to the CAISO for Settlement in the Day-Ahead Market that are confirmed through the Physical Trade post market confirmation as provided in Section 28.1.6.3 shall be settled at the Day-Ahead LMP at the relevant PNode. All MWh quantities of

11.21 Make Whole Payments for Price Corrections

11.21.1 CAISO Demand and Exports

If the CAISO corrects an LMP in the upward direction pursuant to Section 35 that impacts Demand in the Day-Ahead Market and the HASP such that either a portion of or the entire cleared CAISO Demand or export Economic Bid curve becomes uneconomic, then the CAISO will calculate and apply the Price Correction Derived LMP for settlement of CAISO Demand and exports in Section 11.2.1.2, 11.2.3, 11.2.1.4 and 11.4.1. The CAISO will calculate a Price Correction Derived LMP for each affected CAISO Demand and exports as follows: the total cleared MWhs of CAISO Demand or exports in the Day-Ahead Schedule or HASP Intertie Schedule, as applicable, multiplied by the corrected LMP, minus the make-whole payment amount, all of which is divided by the total cleared MWhs of CAISO Demand or export in the Day-Ahead Schedule or HASP Intertie Schedule, as applicable. The make-whole payment amount will be calculated on an hourly basis determined by the area between the Scheduling Coordinator's CAISO Demand or Export Bid curve and the corrected LMP, which is calculated as the MWhs each of the cleared bid segment in the Day-Ahead Schedule or HASP Intertie Schedule for the affected resource, multiplied by the maximum of zero or the corrected LMP minus the bid segment price. For the purpose of this calculation, the CAISO will not factor in a make-whole payment amount for Self-Scheduled CAISO Demand or exports. Any non-zero amounts in revenue collected as a result of the application of the Price Correction Derived LMP will be captured through the allocation of non-zero amounts of the sum of Imbalance Energy, Uninstructed Imbalance Energy, and Unaccounted for Energy in accordance with Section 11.5.4.

11.21.2 Price Correction for Settlement of Virtual Awards

If the CAISO corrects an LMP pursuant to Section 35 that affects a Virtual Award such that either a portion or the entirety of the Virtual Bid Curve associated with the Virtual Award becomes uneconomic, then the CAISO will calculate and apply the price correction for settlement of Virtual Awards as follows: the total cleared MWhs of Virtual Awards multiplied by the corrected LMP, plus the make-whole amount. The make-whole amount for Virtual Demand Awards will be calculated on an hourly basis determined by the area between the Virtual Bid Curve and the corrected LMP, which is calculated as the MWhs in each of the cleared Virtual Bid segments of the Virtual Demand Bid multiplied by the maximum of zero or the corrected LMP minus the Virtual Bid segment price. For Virtual Supply Awards, the make-whole amount will be calculated on an hourly basis determined by the area between the Virtual Bid Curve and the corrected LMP, which is calculated as the MWhs in each of the cleared Virtual Bid segments of the Virtual Supply Bid multiplied by the maximum of zero or the Virtual Bid segment price minus the corrected LMP.

11.22.2.4 [NOT USED]

11.22.2.5 Allocation of the GMC Among Scheduling Coordinators

The costs recovered through the Grid Management Charge shall be allocated to the service charges that comprise the Grid Management Charge. If the CAISO's revenue requirement for any service charge changes from the most recent FERC-approved revenue requirement for that service charge, the costs recovered through that service charge shall be delineated in a filing to be made at FERC as set forth in Section 11.22.2.6. The service charges, as described in more detail in Appendix F, Schedule 1, Parts A and F, are as follows:

(a) Core Reliability Services – Demand Charge;

(b) Core Reliability Services – Energy Exports Charge;

(c) Energy Transmission Services – Net Energy Charge;

(d) Energy Transmission Services – Uninstructed Deviations Charge;

(e) Core Reliability Services/Energy Transmission Services – Transmission Ownership Rights Charge;

(f) Forward Scheduling Charge;

(g) Market Usage Charge;

(h) Settlements, Metering, and Client Relations Charge; and

(i) Virtual Award Charge.

The charges shall be levied separately monthly in arrears on all Scheduling Coordinators based on the billing determinants specified below for each charge in accordance with formulae set out in Appendix F, Schedule 1, Part A, subject to the requirements set out in Appendix F, Schedule 1, Part F.

according to the formula in Appendix F, Schedule 1, Part A, subject to the requirements set out in Appendix F, Schedule 1, Part F.

11.22.2.5.7 Market Usage Charge.

The Market Usage Charge for each Scheduling Coordinator is calculated according to the formula in Appendix F, Schedule 1, Part A, subject to the requirements set out in Appendix F, Schedule 1, Part F. For a Scheduling Coordinator for a Load following MSS, Instructed Imbalance Energy associated with Load following instructions will not be assessed the Market Usage Charge for Instructed Imbalance Energy and will be netted with Uninstructed Imbalance Energy for determining the Market Usage Charge for net Uninstructed Imbalance Energy.

11.22.2.5.8 Settlements, Metering, and Client Relations Charge.

The Settlements, Metering, and Client Relations Charge for each Scheduling Coordinator is fixed at $1000.00 per month, per Scheduling Coordinator ID with an invoice value other than $0.00 in the current Trading Month, as indicated in Appendix F, Schedule 1, Part A, subject to the requirements set out in Appendix F, Schedule 1, Part F. Excess GMC costs related to the provision of these services that are not recovered through this charge are allocated to the other GMC service categories as specified in Appendix F, Schedule 1, Part E.

11.22.2.5.9 Virtual Award Charge

The Virtual Award Charge for each Scheduling Coordinator will be calculated according to the formula in Appendix F, Schedule 1, Part A, subject to the requirements set out in Appendix F, Schedule 1, Parts A, C and E.

11.22.2.6.1 Credits and Debits of the Grid Management Charge.

In addition to the adjustments permitted under Section 11.29.7.3.3, the CAISO shall credit or debit, as appropriate, the account of a Scheduling Coordinator for any overpayment or underpayment of the Grid Management Charge that the CAISO determines occurred due to error, omission, or miscalculation by the CAISO or the Scheduling Coordinator.

11.22.3 MSS GMC Charges.

If the CAISO is charging Grid Management Charges for Uninstructed Imbalance Energy, and the Scheduling Coordinator for a Load-following MSS has Uninstructed Imbalance Energy associated with the MSS's resources, then the CAISO will net the Generation and imports into the MSS to match the Demand and exports out of the MSS, and will not assess the Grid Management Charge associated with Uninstructed Imbalance Energy for such portion of Energy that is used to match MSS Demand and net exports.

11.22.3.1 If Generation, above the amount to cover Demand and exports, was sold into the CAISO's Real-Time Market, then the Scheduling Coordinator for the MSS will be charged the Grid Management Charge associated with Uninstructed Imbalance Energy for this quantity.

11.22.3.2 If insufficient Generation and imports was available to cover Demand and exports, and the Scheduling Coordinator for the MSS purchased Uninstructed Imbalance Energy from the CAISO Markets, then such Scheduling Coordinator will be charged the Grid Management Charge associated with Uninstructed Imbalance Energy for this quantity.

11.22.3.3 Grid Management Charges associated with Uninstructed Imbalance Energy (the Energy Transmission Services – Uninstructed Deviations and Market Usage Charges) will be treated on a net basis by Settlement interval. The Core Reliability Services – Demand Charge, Core Reliability Services – Energy Exports Charge, and Energy Transmission Services – Net Energy Charge will be charged based on Metered Balancing Authority Area Load, including exports out of the MSS. Ancillary Service Bids accepted by the CAISO and Instructed Imbalance Energy will be assessed the applicable Market Usage Charges.

11.22.4 Virtual Bid Submission Charge

Each Scheduling Coordinator submitting a Virtual Bid will be subject to a Virtual Bid Submission Charge of $0.005 for each Virtual Bid segment that is passed to the IFM.

[Not Used]

[Not Used]

11.25 [NOT USED]

11.26 [NOT USED]

11.27 Voltage Support and Black Start Charges.

The CAISO shall calculate, account for and settle charges and payments for Voltage Support and Black Start as set out in Sections 11.10.1.4, 11.10.1.5, 11.10.7, 11.10.8, and the applicable Business Practice Manual.

11.28 The CAISO shall calculate, charge and disburse all collected default Interest in accordance with the CAISO Tariff.

11.29 Billing and Payment Process.

The CAISO will calculate for each charge the amounts payable by the relevant Scheduling Coordinator, CRR Holder, Black Start Generator or Participating TO for each Settlement Period of the Trading Day, and the amounts payable to that Scheduling Coordinator, CRR Holder, Black Start Generator or Participating TO for each charge for each Settlement Period of that Trading Day and shall arrive at a net amount payable for each charge by or to that Scheduling Coordinator, CRR Holder, Black Start Generator or Participating TO for each charge for that Trading Day. Each of these amounts will appear in the Settlement Statements that the CAISO will provide to the relevant Scheduling Coordinator, CRR Holder, Black Start Generator or Participating TO.

11.31.3 Allocation of Import/Export Decline Monthly Charges Collected.

On the Settlement Statements issued for the last Trading Day of the applicable Trading Month, each Scheduling Coordinator shall receive a credit for its share of the total of all Decline Monthly Charges – Imports and Decline Monthly Charges – Exports assessed to Scheduling Coordinators for the applicable Trading Month. The credits shall be allocated according to the proportion of each Scheduling Coordinator's Measured CAISO Demand to total Measured CAISO Demand for the CAISO Balancing Authority Area during the Trading Month.

11.32 Measures to Address Intertie Scheduling Practices

The CAISO will take the following actions regarding Schedules that clear the Day-Ahead Market at the Interties and that a Scheduling Coordinator wholly or partially reverses in the HASP:

(i) The CAISO will charge the Scheduling Coordinator the positive difference between the Day-Ahead Market price and the HASP price applicable to any imports that clear the Day-Ahead Market and are reduced in the HASP for which the Scheduling Coordinator has failed to submit an E-Tag or E-Tags consistent with the Scheduling Coordinator's Day-Ahead Schedule and WECC scheduling criteria.

(ii) The CAISO will treat any reduction by a Scheduling Coordinator to a Day-Ahead import or export Schedule in the HASP as a Virtual Award for purposes of adjusting CRR Revenue pursuant to Section 11.2.4.6 if the Scheduling Coordinator submits Schedules on behalf of or is a CRR Holder.

(iii) For any import Schedule that clears the Day-Ahead Market which a Scheduling Coordinator reduces in the HASP, such reduced quantities will be subject to the allocation of Net RTM Bid Cost Uplift as set forth in Section 11.8.6.6.

(iv) The provisions of this Section 11.32 will not apply to Schedules that clear the Day-Ahead Market at the Interties and that a Scheduling Coordinator wholly or partially reverses in the HASP to the extent such Schedules are balanced ETC Self-Schedules, balanced TOR Self-Schedules, or balanced Converted Rights Self-Schedules.

12.1.1.2 Credit Strength Indicators

In determining a Market Participant's Unsecured Credit Limit, the CAISO may rely on information gathered from financial reporting agencies, the general/financial/energy press, and provided by the Market Participant to assess its overall financial health and its ability to meet its financial obligations. Information considered by the CAISO in this process may include the following qualitative factors:

(a) Applicant's history;

(b) Nature of organization and operating environment;

(c) Management;

(d) Contractual obligations;

(e) Governance policies;

(f) Financial and accounting policies;

(g) Risk management and credit policies;

(h) Market risk including price exposures, credit exposures and operational exposures;

(i) Event risk;

(j) The state or local regulatory environment; and

(k) Affiliate disclosure information provided pursuant to this CAISO Tariff, including Sections 4.14.2.1, 12.1.1, 39.9, and/or 39.11.1.

Material negative information in these areas may result in a reduction of up to one hundred percent (100%) in the Unsecured Credit Limit that would otherwise be granted based on the six-step process described in Section 12.1.1.1. A Market Participant, upon request, will be provided a written analysis as to how the provisions in Section 12.1.1.1 and this section were applied in setting its Unsecured Credit Limit.

12.1.3.1.1 Calculation of the EAL Amount

Except as described in Section 12.1.3.1.2, the CAISO shall use the method described in this Section 12.1.3.1.1 to calculate each Market Participant's Estimated Aggregate Liability (EAL). The Estimated Aggregate Liability represents the amount owed to the CAISO for all unpaid obligations, specifically, the obligations for the number of Trading Days outstanding at a given time based on the CAISO's Payments Calendar plus five (7) Trading Days based on the allowable period for Market Participants to respond to CAISO requests for additional Financial Security collateral (three (3) Business Days), and other liabilities including the value of a Market Participant's CRR portfolio, if negative. The charges the CAISO shall use to calculate Estimated Aggregate Liability shall be charges described or referenced in the CAISO Tariff. The CAISO shall calculate the Estimated Aggregate Liability for each Market Participant by aggregating the following obligations:

(a) invoiced amounts, i.e., any published but unpaid amounts on Invoices;

(b) published amounts, i.e., amounts for Trading Days for which Settlement Statements have been issued;

(c) estimated amounts, i.e., amounts based on estimated Settlement amounts calculated by the Settlement system using estimated meter data, and other available operational data;

(d) extrapolated amounts, i.e., amounts calculated for Trading Days for which neither actual nor estimated Settlement Statements have been issued;

(e) CRR portfolio value, i.e., the prospective value of the CRR portfolio, if negative, as described in Section 12.6.3;

(f) CRR Auction limit, i.e., the maximum credit limit for participation in a CRR Auction;

(g) CRR Auction awards (prior to invoicing), i.e., amounts to cover winning offers at the completion of the CRR Auction bur prior to invoicing;

(h) Estimated Aggregate Liability adjustments resulting from Virtual Bid Submission Charges and the submission of Virtual Bids and/or receipt of Virtual Awards pursuant to Section 12.8;

(i) past-due amounts, i.e., any unpaid or past due amounts on Invoices;

(j) FERC Annual FERC Charges, i.e., FERC Annual Charges for a Market Participant that has elected to pay such amounts on an annual basis that are owed and outstanding and not already captured in any other component of Estimated Aggregate Liability;

(k) WAC Charges, i.e., WAC amounts for the current year or future years as specified in Section 36.9.2;

(l) Estimated Aggregate Liability adjustments, i.e., adjustments that may be necessary as a result of analysis performed as a result of Section 12.4.2; and

(m) extraordinary adjustments, i.e., adjustments to Settlement amounts related to FERC proceedings, if known and estimated by the CAISO, as described in Section 12.1.3.1.3.

For a Market Participant that maintains multiple BAID numbers, the Estimated Aggregate Liability of the Market Participant as a legal entity shall be calculated by summing the Estimated Aggregate Liabilities for all such BAID numbers and comparing the sum of the Estimated Aggregate Liabilities to the Aggregate Credit Limit of the Market Participant. Market Participants may recommend changes to the liability estimates produced by the CAISO's Estimated Aggregate Liability calculation through the dispute procedures described in Section 12.4.2.

12.8 Credit Requirements Applicable to Virtual Bids

12.8.1 Credit Check in the Day-Ahead Market

12.8.1.1 Credit Check Requirements

For each Scheduling Coordinator that submits one or more Virtual Bids in the Day-Ahead Market, the CAISO will estimate the total value of all of the submitted Virtual Bids after the Virtual Bids have been validated in accordance with Section 30.7.3. In all circumstances except where the Scheduling Coordinator submits both a Virtual Supply Bid and a Virtual Demand Bid at the same Eligible PNode or Eligible Aggregated PNode for the same Trading Hour, the CAISO will estimate the total value of the submitted Virtual Bids at each Eligible PNode or Eligible Aggregated PNode for each Trading Hour by calculating the sum of the products of the absolute values of the MWs of the submitted Virtual Bids multiplied by the applicable Virtual Bid Reference Price at the Eligible PNode or Eligible Aggregated PNode for all Trading Hours. In circumstances where the Scheduling Coordinator submits both a Virtual Supply Bid and a Virtual Demand Bid at the same Eligible PNode or Eligible Aggregated PNode for the same Trading Hour, the CAISO will estimate the total value of the submitted Virtual Bids at the Eligible PNode or Eligible Aggregated PNode for the Trading Hour by calculating the greater of (i) the product of the absolute value of the MW of the submitted Virtual Supply Bid multiplied by the Virtual Bid Reference Price for Virtual Supply Bids at the Eligible PNode or Eligible Aggregated PNode or (ii) the product of the absolute value of the MW of the submitted Virtual Demand Bid multiplied by the Virtual Bid Reference Price for Virtual Demand Bids at the Eligible PNode or Eligible Aggregated PNode. The CAISO will then adjust the Scheduling Coordinator's Estimated Aggregate Liability to include the CAISO's estimate of the total value of the submitted Virtual Bids. If the adjusted Estimated Aggregate Liability is greater than the Scheduling Coordinator's Aggregate Credit Limit, the CAISO will reject the Scheduling Coordinator's submitted Virtual Bids. After rejection of its submitted Virtual Bids, a Scheduling Coordinator may submit revised Virtual Bids, subject to the timelines set forth in the CAISO Tariff and the applicable Business Practice Manual regarding the submission of Bids.

12.8.1.2 Temporary Suspension of Virtual Bidding

In the event that the financial exposure of Scheduling Coordinators cannot be determined pursuant to Section 12.8.1.1 with a reasonable degree of accuracy due to factors such as software or system failures, the CAISO may temporarily suspend virtual bidding. If the CAISO temporarily suspends virtual bidding pursuant to this Section 12.8.1.2, as soon as reasonably practicable, the CAISO will notify FERC and Market Participants of the reason(s) for any suspension of virtual bidding, the action(s) necessary to restore virtual bidding, and the estimated time required to restore virtual bidding. The CAISO does not intend to suspend virtual bidding in the event of brief intermittent software or system failures or where the CAISO anticipates the credit checking functionality will be available prior to the close of the Day-Ahead Market. During instances of software or system failures that extend past the close of the Day-Ahead Market and in the absence of any suspension of virtual bidding, the CAISO will accept pending Virtual Bids at the close of the Day-Ahead Market even though the Virtual Bids have not been validated by the credit checking functionality. Any resulting financial obligations will be included in the next available calculation of each Scheduling Coordinator's Estimated Aggregate Liability.

12.8.2 Virtual Bid Reference Prices

For Virtual Supply Bids, the Virtual Bid Reference Price will be the 95th percentile value of the difference between the LMP in the Real-Time Market (or in the HASP for Virtual Supply Bids at the Interties) and the LMP in the Day-Ahead Market at a given Eligible PNode or Eligible Aggregated PNode. For Virtual Demand Bids, the Virtual Bid Reference Price will be the 95th percentile value of the difference between the LMP in the Day-Ahead Market and the LMP in the Real-Time Market (or in the HASP for Virtual Supply Bids at the Interties) at a given Eligible PNode or Eligible Aggregated PNode. Each Virtual Bid Reference Price will be calculated in $/MWh. The CAISO will calculate the Virtual Bid Reference Price for each Eligible PNode or Eligible Aggregated PNode for three-month periods (covering January-March, April-June, July-September, and October-December) of each year using the hourly actual LMPs for the same period of the previous year.

12.8.3 Adjustment of EAL After Close of the DAM

After the Day-Ahead Market closes but before the Real-Time Market closes, the CAISO will recalculate the estimate of the total liability of the Virtual Bids of each Scheduling Coordinator based on the MW quantity that cleared in the Day-Ahead Market. The revised total estimated liability will equal the sum of the products of the absolute values of the amounts of MWs of Virtual Awards multiplied by the Virtual Bid Reference Price. The CAISO will then adjust the Estimated Aggregate Liability of the Scheduling Coordinator to reflect the revised total estimated liability of the Virtual Bids as calculated by the CAISO.

12.8.4 Adjustment of EAL After the Close of the RTM

After the Real-Time Market closes, the CAISO will recalculate the total liability of each Scheduling Coordinator with Virtual Awards based on the MW quantity that cleared in the Day-Ahead Market and the LMPs produced in the Day-Ahead Market, HASP, and Real-Time Market. The total liability of a Scheduling Coordinator will equal the sum of the liability of each Virtual Bid submitted by the Scheduling Coordinator that cleared in the Day-Ahead Market. The liability of a Virtual Supply Bid will equal the product of the value of the amount of cleared MWs multiplied by the difference between the Real-Time or HASP LMP, as appropriate, and the Day-Ahead LPM at the Eligible PNode or Eligible Aggregated PNode at which the Virtual Supply Bid was submitted. The liability of a Virtual Demand Bid will equal the product of the value of the amount of cleared MWs multiplied by the difference between the Day-Ahead LPM and the Real-Time or HASP LMP, as appropriate, at the Eligible PNode or Eligible Aggregated PNode at which the Virtual Demand Bid was submitted. The Estimated Aggregate Liability will be adjusted accordingly and will continue to be adjusted as a result of any price correction made in accordance with Section 35.

30.2 Bid Types

There are three types of Bids: Energy Bids (which include Virtual Bids), Ancillary Services Bids, and RUC Availability Bids. Each Bid type can be submitted as either an Economic Bid or a Self-Schedule (except for RUC Availability Bids and Virtual Bids, which cannot be self-scheduled). Economic Bids specify prices for MW amounts of capacity or MWh amounts of Energy. Self-Schedules do not have any prices associated for MW or MWh. Energy Bids, including both Economic Bids and Self-Schedules, may be either Supply Bids, Demand Bids, Virtual Supply Bids, or Virtual Demand Bids. Ancillary Services Bids and RUC Availability Bids are Supply Bids only. Ancillary Services may be self-provided by providing a Submission to Self-Provide an Ancillary Service and having that submission accepted by the CAISO. Rules for submitting the three types of Bids vary by the type of resource to which the Bid applies as described in Section 30.5 and as further required in each CAISO Markets process as specified in Sections 31, 33, and 34.

30.3 [NOT USED]

30.4 Election for Start-Up Costs and Minimum Load Costs.

Scheduling Coordinators for Generating Units and Resource-Specific System Resources may elect on a 30-day basis either of the two options provided below (the Proxy Cost option or the Registered Cost option) for specifying their Start-Up Costs and Minimum Load Costs to be used for those resources in the CAISO Markets Processes. Unless the Scheduling Coordinator has registered Start-Up Costs and Minimum Load Costs in the Master File in accordance with the Registered Cost option, the CAISO will assume the Proxy Cost option as the default option.

30.7.3.6 Additional Bid Validation Rules for Virtual Bids

In addition to the validation rules described in Section 30.7.3.1, Virtual Bids will be subject to the following additional validation rules.

30.7.3.6.1 Scheduling Coordinator Validation

The CAISO will validate that the SCID associated with a Virtual Bid is submitted from a Scheduling Coordinator authorized to submit Virtual Bids and that the Virtual Bid is submitted at an Eligible PNode or Eligible Aggregated PNode. The CAISO will reject Virtual Bids that do not satisfy these requirements.

30.7.3.6.2 Credit Requirement

Virtual Bids must satisfy the credit requirements of Section 12.8. The Scheduling Coordinator will be notified if Virtual Bids fail to satisfy the credit requirements. If the Scheduling Coordinator fails to resubmit Virtual Bids that satisfy the credit requirements or to provide adequate additional Financial Security, the CAISO will reject the Scheduling Coordinator's Virtual Bids on a last-in, first-out basis.

30.7.3.6.3 Position Limits

For each Convergence Bidding Entity, the CAISO will reject all Virtual Bids submitted by its Scheduling Coordinator at any Eligible PNode, Eligible Aggregated PNode (other than a Default LAP or Trading Hub), or Intertie that exceed the position limits specified in this Section 30.7.3.6.3. If the Scheduling Coordinator uses multiple SCIDs on behalf of a Convergence Bidding Entity, the position limits will apply to the sum of those Virtual Bids submitted at the Eligible PNode, Eligible Aggregated PNode (other than a Default LAP or Trading Hub), or Intertie. The CAISO will perform all position limit calculations based on the highest Virtual Bid segment MW point submitted in the Virtual Bid Curve. The CAISO will not net Virtual Supply Bids and Virtual Demand Bids in performing the position limit calculations. The affected Scheduling Coordinator will be provided notice that position limits have been violated. If the Scheduling Coordinator does not resubmit Virtual Bids within the position limits, the CAISO will reject Virtual Bids for all hours at each Eligible PNode, Eligible Aggregated PNode (other than a Default LAP or Trading Hub), and Intertie where the position limits are violated. Position limits only apply to Eligible PNodes, Eligible Aggregated PNodes (other than Default LAPs or Trading Hubs), and Interties.

30.7.3.6.3.1 Position Limits at Eligible PNodes and Eligible Aggregated PNodes

For an Eligible PNode associated with a single physical supply resource, the CAISO will publish a locational limit that will be equal to the PMax of the physical supply resource. For an Eligible PNode or Eligible Aggregated PNode (other than a Default LAP or Trading Hub) associated with more than one physical supply resource, the CAISO will publish a locational limit that will be equal to the sum of the PMaxes of the physical supply resources. For an Eligible PNode associated with a single physical demand resource, the CAISO will publish a locational limit that will be equal to the forecast of the maximum MW consumption of the physical demand resource. For an Eligible PNode or Eligible Aggregated PNode (other than a Default LAP or Trading Hub) associated with more than one physical demand resource, the CAISO will publish a locational limit that will be equal to the forecast of the maximum MW consumption of the physical demand resources. The percentages used to calculate the position limits for each Convergence Bidding Entity at Eligible PNodes and Eligible Aggregated PNodes (other than Default LAPs or Trading Hubs) will be the following percentages of the published locational limits:

(a) Position limits of ten (10) percent will apply during the time period beginning as of the effective date of this tariff provision through the last day of the eighth month following the effective date of this tariff provision.

(b) Position limits of fifty (50) percent will apply during the time period beginning as of the first day of the ninth month following the effective date of this tariff provision through the last day of the twelfth month following the effective date of this tariff provision.

(c) Position limits will cease to apply beginning on the first day of the month as of the first anniversary of the effective date of this tariff provision.

The CAISO will enforce the position limits for Eligible PNodes and Eligible Aggregated PNodes (other than Default LAPs or Trading Hubs) at the time of Virtual Bid submission. It is possible for the enforcement of position limits on a later-submitted Virtual Bid to cause a previously approved Virtual Bid to be rejected, if both of those Virtual Bids are submitted by a Scheduling Coordinator on behalf of the same Convergence Bidding Entity at the same Eligible PNode or Eligible Aggregated PNode (other than a Default LAP or Trading Hub). The CAISO will timely publish the locational limits for Eligible PNodes and Eligible Aggregated PNodes (other than Default LAPs or Trading Hubs).

30.7.3.6.3.2 Position Limits at Interties

For an Intertie, the locational limits will be equal to a percentage of the Operating Transfer Capability of the Intertie. The percentages used to calculate the position limits of each Convergence Bidding Entity at Interties will be the following percentages of the published locational limits**:**

(a) Position limits of five (5) percent will apply during the time period beginning as of the effective date of this tariff provision through the last day of the eighth month following the effective date of this tariff provision.

(b) Position limits of twenty-five (25) percent will apply during the time period beginning as of the first day of the ninth month following the effective date of this tariff provision through the last day of the twelfth month following the effective date of this tariff provision.

(c) Position limits of fifty (50) percent will apply during the time period beginning on the first day of the month as of the first anniversary of the effective date of this tariff provision through the last day of the sixteenth month following the effective date of this tariff provision.

(d) Position limits will cease to apply beginning on the first day of the seventeenth month following the effective date of this tariff provision.

The CAISO will enforce the locational limits for Interties at Bid submission and at Market Close for Virtual Bids. The CAISO will utilize the 9:00 AM Operating Transfer Capability for Bids submitted after 9:00 AM until the close of the Day-Ahead Market for the next Trading Day.

30.8 Prohibition on Bidding Across Out-of-Service Transmission Paths at Scheduling Points

Scheduling Coordinators shall not submit any Bids, including Virtual Bids or ETC Self-Schedules at Scheduling Points using a transmission path for any Settlement Period for which the 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 Operating Transfer Capability on the transmission path is zero (0) MW. If the 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.

30.9 Virtual Bids

Virtual Bids are Energy Bids that may be submitted only in the Day-Ahead Market, at Eligible PNodes or Eligible Aggregated PNodes, by Scheduling Coordinators representing Convergence Bidding Entities. Virtual Bids are either Virtual Supply Bids or Virtual Demand Bids. A Virtual Bid submitted in the Day-Ahead Market and cleared in the IFM represents a commitment to liquidate a Day-Ahead award in the Real-Time Market at the price determined for the applicable Eligible PNode or Eligible Aggregated PNode as set forth in Section 11.3. For each SCID associated with a Convergence Bidding Entity, there may be only one Virtual Supply Bid and one Virtual Demand Bid per each Eligible PNode or Eligible Aggregated PNode in the Day-Ahead Market. The minimum size of a segment of a Virtual Bid is one (1) MW.

30.9.1 Virtual Bid Components

Each Virtual Bid must have the following components: an indicator that identifies the Virtual Bid as a Virtual Supply Bid or a Virtual Demand Bid; Scheduling Coordinator ID Code; Eligible PNode or Eligible Aggregated PNode as applicable; Virtual Bid Curve; and the Trading Hour or Trading Day to which the Virtual Bid applies. Virtual Bids do not include Start-Up Costs or Minimum Load Costs.

30.10 Use of AC Solution and Nodal MW Constraints

The CAISO will achieve an alternating current (AC) solution in the Day-Ahead Market to the extent practicable. If and when it is impracticable to achieve an AC power flow solution without the initial enforcement of nodal MW limit constraints, the CAISO will apply nodal MW constraints to Eligible PNodes (except for Eligible PNodes established for Interties, which are addressed through the process described in Section 31.9). The CAISO will determine whether to apply such nodal MW constraints as follows:

(i) The CAISO will calculate a MW limit for each Eligible PNode other than an Eligible PNode established for an Intertie. For an Eligible PNode associated with physical supply resource, the MW limit will be equal to a factor multiplied by the PMax of the physical supply resource. For an Eligible PNode associated with a physical demand resource, the MW limit will be equal to a factor multiplied by the nodal load forecast of the Eligible PNode calculated as the MW portion of the System Demand Forecast that is distributed to the Eligible PNode according to the corresponding system Load Distribution Factor associated with the Eligible PNode. The factors used in these calculations will be determined in accordance with a process set forth in the Business Practice Manuals.

(ii) For each of the Eligible PNodes or group of Eligible PNodes, the CAISO will calculate the percentage by which the sum of the MW amounts of all Energy Supply Bids, Demand Bids, and Virtual Bids exceeds the MW limit calculated pursuant to Section 30.10(i).

(iii) Starting with the Eligible PNodes or group of Eligible PNodes at which the MW limits would be exceeded by the largest percentages, and working in descending order of the Eligible PNodes or group of Eligible PNodes that would exceed their MW limits ranked by the extent to which the corresponding MW limits would be exceeded, the CAISO will apply the MW limits to all Energy Supply Bids, Demand Bids, and Virtual Bids at the applicable Eligible PNodes or group of Eligible PNodes and run iterations of the IFM until the CAISO Markets can achieve an AC solution. The application of the MW limit will be enforced by means of a MW limit constraint on the sum of the nodal Energy Supply Bids, Demand Bids, and Virtual Bids as well as the portions of the aggregate Energy Supply Bids, Demand Bids, and Virtual Bids that are applicable to the Eligible PNodes or group of Eligible PNodes. The MW limit constraints will be enforced in the IFM optimization engine to curtail the Bids at the Eligible PNodes or group of Eligible PNodes that have been identified as candidates for causing AC convergence issues. The IFM optimization engine will use the economic criteria based on Bid prices and effectiveness of Bids to mitigate the violation of the MW limit at the Eligible PNode or group of Eligible PNodes.

31. Day-Ahead Market.

The DAM consists of the following functions performed in sequence: the MPM-RRD, IFM, and RUC. Scheduling Coordinators may submit Bids for Energy, Ancillary Services and RUC Capacity for an applicable Trading Day. The CAISO shall issue Schedules for all Supply and Demand, including Participating Load, pursuant to their Bids as provided in this Section 31.

31.1 Bid Submission and Validation in the Day-Ahead Market.

Bids, including Self-Schedules and Ancillary Services Bids, and Submissions to Self-Provide an Ancillary Service shall be submitted pursuant to the submission rules specified in Section 30. Scheduling Coordinators submit a single Bid to be used in the DAM, which includes the MPM-RRD, the IFM and RUC. Scheduling Coordinators may submit Bids for the DAM as early as seven (7) days ahead of the targeted DAM and up to Market Close of the DAM for a targeted Trading Day. The CAISO will validate all Bids submitted to the DAM pursuant to the procedures set forth in Section 30.7. Scheduling Coordinators must submit Bids for participation in the IFM for Resource Adequacy Capacity as required in Section 40.

31.2 MPM-RRD

After the Market Close of the DAM, and after the CAISO has validated the Bids pursuant to Section 30.7, the CAISO will perform the MPM-RRD procedures in a series of processing runs that occur prior to the IFM Market Clearing run. The MPM process determines which Bids need to be mitigated in the IFM. The RRD process is the automated process for determining RMR Generation requirements for RMR Units. The MPM-RRD process optimizes resources using the same optimization used in the IFM, but instead of

using Demand Bids as in the IFM the MPM-RRD process optimizes resources to meet one hundred percent of the CAISO Demand Forecast and Export Bids to the extent the Export Bids are selected in the MPM-RRD process, and meet one hundred percent of Ancillary Services requirements based on Supply Bids submitted to the DAM. Virtual Bids are excluded from the MPM-RRD process. The mitigated or unmitigated Bid identified in the MPM-RRD process for all resources that cleared in the MPM-RRD are then passed to the IFM. The CAISO performs the MPM-RRD for the DAM for the twenty-four (24) hours of the targeted Trading Day.

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 are expected to be enforced in the Integrated Forward Market are enforced. All RMR Units, Condition 1 and Condition 2, are considered in the ACR.

31.2.2 Bid Mitigation.

The CAISO shall compare the resource dispatch levels derived from CCR and ACR and will mitigate Bids as follows.

each hour of the next Trading Day. RUC Capacity is selected by a SCUC optimization that uses the same Base Market Model used in the IFM adjusted as described in Section 27.5.1 and 27.5.6 to help ensure the deliverability of Energy from the RUC Capacity.

31.5.1 RUC Participation.

31.5.1.1 Capacity Eligible for RUC Participation

RUC participation is voluntary for capacity that has not been designated as Resource Adequacy Capacity. Scheduling Coordinators may make such capacity available for participation in RUC by submitting a RUC Availability Bid, provided the Scheduling Coordinator has also submitted an Energy Bid (other than a Virtual Bid) for such capacity into the IFM. Virtual Bids are not eligible to participate in RUC. Capacity from Non-Dynamic System Resources that has not been designated Resource Adequacy Capacity is not eligible to participate in RUC. Capacity from resources including System Resources that has been designated as qualified Resource Adequacy Capacity must participate in RUC. RUC participation is required for Resource Adequacy Capacity to the extent that Resource Adequacy Capacity is not committed following the IFM. System Resources eligible to participate in RUC will be considered on an hourly basis; that is, RUC will not observe any multi-hour block constraints. RUC will observe the Energy Limits that may have been submitted in conjunction with Energy Bids to the IFM. RMR Unit capacity will be considered in RUC in accordance with Section 31.5.1.3. MSS resources may participate in RUC in accordance with Section 31.5.2.3. COG resources are accounted for in RUC, but may not submit or be paid RUC Availability Payments. The ELS Resources committed through the ELC Process conducted two (2) days before the day the RUC process is conducted for the next Trading Day as described in Section 31.7 are binding.

31.5.1.2 RUC Availability Bids.

Scheduling Coordinators may only submit RUC Availability Bids for capacity (above the Minimum Load) for which they are also submitting an Energy Bid (other than a Virtual Bid) to participate in the IFM. The RUC Availability Bid for the Resource Adequacy Capacity submitted by a Scheduling Coordinator must be $0/MW per hour for the entire Resource Adequacy Capacity. If the Scheduling Coordinator fails to submit a $0/MW per hour for

31. 8 Constraints at Scheduling Points for Interties

Within the IFM optimization, the CAISO enforces two (2) constraints at each Intertie Scheduling Point so that Virtual Bids do not result in net interchange schedules violating scheduling limits unless the bidding prohibition set forth in Section 30.8 applies. The first constraint is that physical imports net of physical exports must be less than or equal to the scheduling limit at the Scheduling Point in the applicable direction. The second constraint is that physical and virtual imports net of physical and virtual exports must be less than or equal to the scheduling limit at the Scheduling Point in the applicable direction**.** Although both constraints are enforced in both scheduling and pricing runs, only the second constraint Shadow Price is incorporated into the pricing run LMPs.

34.1 Inputs to the Real-Time Market

The RTM utilizes results produced by the DAM and HASP for each Trading Hour of the Trading Day, including the combined commitments contained in the Day-Ahead Schedules, Day Ahead AS Awards, RUC Awards, HASP Intertie Schedules, HASP Self-Schedules, HASP Intertie AS Awards and the MPM-RRD that is run as part of the HASP to determine reliability needs and mitigated bids for each relevant Trading Hour. Virtual Bids and Virtual Awards are not used in the Real-Time Market. These results, plus the short-term Demand Forecast, Real-Time Energy Bids, Real-Time Ancillary Service Bids, updated FNM, State Estimator output, resource outage and de-rate information constitute the inputs to the RTM processes. Bids submitted in HASP for all Generating Units and Participating Load shall be used in the Real-Time Market.

34.2 Real-Time Unit Commitment.

The Real-Time Unit Commitment (RTUC) process uses SCUC and is run every fifteen (15) minutes to: (1) make commitment decisions for Fast Start and Short Start resources having Start-Up Times within the Time Horizon of the RTUC process, and (2) procure required additional Ancillary Services and calculate ASMP used for settling procured Ancillary Service capacity for the next fifteen-minute Real-Time Ancillary Service interval. The RTUC can also be run with the Contingency Flag activated, in which case the RTUC can commit Contingency Only Operating Reserves. If RTUC is run without the Contingency Flag activated, it cannot commit Contingency Only Operating Reserves. RTUC is run four times an hour, at the following times for the following Time Horizons: (1) at approximately 7.5 minutes prior to the next Trading Hour, in conjunction with the HASP run, for T-45 minutes to T+60 minutes; (2) at approximately 7.5 minutes into the current hour for T-30 minutes to T+60 minutes; (3) at approximately 22.5 minutes into the current hour for T-15 minutes to T+60 minutes; and (4) at approximately 37.5 minutes into the current hour for T to T+60 minutes where T is the beginning of the next Trade Hour. The HASP, described in Section 33, is a special RTUC run that is performed at approximately 7.5 minutes before each hour and has the additional responsibility of: (1) pre-dispatching Energy and awarding Ancillary Services for hourly dispatched System Resources for the Trading Hour that begins 67.5 minutes later, and (2) performing the necessary MPM-RRD for that Trading Hour.

37.2.6 Per Day Limitation on Amount of Sanctions

The amount of Sanctions that any Market Participant will incur for committing two or more violations of Section 37.2.1, Section 37.2.2 or Section 37.2.4 on the same day will be no greater than $10,000 per day.

37.3 Submit Feasible Energy Bids, RUC Capacity Bids, Ancillary Service Bids, and Submissions to Self-Provide an Ancillary Service.

37.3.1 Bidding Generally.

37.3.1.1 Expected Conduct.

Market Participants must submit Bids for Energy, RUC Capacity and Ancillary Services and Submissions to Self-Provide an Ancillary Service from resources that are reasonably expected to be available and capable of performing at the levels specified in the Bid, and to remain available and capable of so performing based on all information that is known to the Market Participant or should have been known to the Market Participant at the time of submission. HASP Intertie Schedules for import or export Energy are not subject to the foregoing requirement, but failure to deliver on such HASP Intertie Schedules can violate the anti-manipulation provisions in Section 37.7 and in any regulations issued by FERC. The requirements of this Section 37.3.1.1 do not apply to the submission of Virtual Bids.

37.3.1.2 Consequence for Non-Performance.

A Market Participant that fails to perform in accordance with the expected conduct described in Section 37.3.1.1 above shall be subject to having the payment rescinded for any portion of an Ancillary Service or RUC Capacity that is unavailable. If a Market Participant fails to deliver on a HASP Intertie Schedule for import or export Energy, it shall be subject to any charge that may apply in Section 11.31and to any penalty or sanction FERC may impose for violation of Section 37.7, but shall not be subject to Sanctions pursuant to any other provision of Section 37, including this Section 37.3.

39.11 Market Power Mitigation Applicable to Virtual Bidding

39.11.1 Affiliate Disclosure Requirements

Each Convergence Bidding Entity must satisfy the Affiliate disclosure requirements set forth in Section 4.14.2.1.

39.11.2 Suspension or Limitation of Virtual Bidding

39.11.2.1 Suspension or Limitation Generally

The CAISO and DMM will monitor virtual bidding activity for anomalous market behavior, gaming, or the exercise of market power. The CAISO may suspend or limit the ability of one or more Scheduling Coordinators to submit Virtual Bids on behalf of one or more Convergence Bidding Entities for any of the reasons set forth in Section 39.11.2.2. The CAISO has the authority to suspend or to limit the ability of one or more Scheduling Coordinators to submit Virtual Bids on behalf of one or more Convergence Bidding Entities regardless of whether the CAISO has evidence that the virtual bidding activities that led to the suspension of limitation were the result of actions purposely or knowingly taken by Scheduling Coordinators or Convergence Bidding Entities to cause the outcomes set forth in Section 39.11.2.2 (including but not limited to actions taken in order to increase CRR revenues received by one or more CRR Holders, regardless of whether such actions result in an adjustment of CRR revenue pursuant to Section 11.2.4.6). The CAISO may exercise its suspension or limitation authority pursuant to this Section 39.11.2 at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes. The CAISO may suspend or limit Virtual Bids that have already been submitted, Virtual Bids that will be submitted in the future, or both. The CAISO's authority to suspend or limit the ability of all Scheduling Coordinators to submit Virtual Bids at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes will be governed by the Market Disruption provisions of Section 7.7.15 of the CAISO Tariff and not this Section 39.11.

39.11.2.2 Reasons for Suspension or Limitation

(a) The CAISO may suspend or limit the ability of one or more Scheduling Coordinators to submit Virtual Bids if the CAISO determines that virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities detrimentally affect System Reliability or grid operations. Virtual bidding activities can detrimentally affect System Reliability or grid operations if such activities contribute to threatened or imminent reliability conditions, including but not limited to the following circumstances:

(i) Submitted Virtual Bids create a substantial risk that the CAISO will be unable to obtain sufficient Energy and Ancillary Services to meet Real-Time Demand and Ancillary Service requirements in the CAISO Balancing Authority Area.

(ii) Submitted Virtual Bids render the CAISO Day-Ahead Market software unable to process Bids submitted into the Day-Ahead Market.

(iii) Submitted Virtual Bids render the CAISO unable to achieve an alternating current (AC) solution in the Day-Ahead Market for an extended period of time.

(b) The CAISO may suspend or limit the ability of one or more Scheduling Coordinators to submit Virtual Bids if the CAISO determines that virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities cause or contribute to unwarranted divergence in prices between the Day-Ahead Market and the HASP or Real-Time Market. The CAISO will determine whether virtual bidding causes or contributes to unwarranted divergence in prices in the Day-Ahead Market and the HASP or Real-Time Market, as applicable, using the following methodology:

(i) The CAISO will calculate the average divergence between Day-Ahead prices and Real-Time prices for the CAISO Balancing Authority Area over a four (4) week period of time or such other period of time that the CAISO determines to be appropriate.

(ii) The CAISO will determine whether there are any Eligible PNodes and/or Eligible Aggregated PNodes at which: (A) the absolute value of the average divergence between Day-Ahead prices and Real-Time prices over that period of time or an appropriate subset of that period of time exceeded the system-wide average divergence in prices calculated pursuant to Section 39.11.2.2(b)(i), by a percentage established by the CAISO pursuant to the applicable Business Practice Manual and (B) the virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities significantly contributed to this excess divergence.

(c) The CAISO may suspend or limit the ability of one or more Scheduling Coordinators to submit Virtual Bids if the CAISO determines that virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities cause or contribute to an unwarranted divergence in Shadow Prices between the Day-Ahead Market and the HASP or Real-Time Market that contributes to a significant divergence in LMPs at any Eligible PNode and/or Eligible Aggregated PNode. The CAISO will base each determination of whether virtual bidding causes or contributes to an unwarranted divergence in Shadow Prices in the Day-Ahead Market and the HASP or Real-Time Market on a calculation of the deviation between average hourly Shadow Prices in the Day-Ahead Market and the HASP or Real-Time Market, as applicable, during a rolling four (4) week period, or such other period that the CAISO determines to be appropriate given the virtual bidding activity under review. If the CAISO calculates that, over the time period employed in the CAISO's review, the virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities has resulted in a deviation between average hourly Shadow Prices in the Day-Ahead Market and the HASP or Real-Time Market (as applicable) the absolute value of which is greater than a percentage established by the CAISO pursuant to the applicable Business Practice Manual and such divergence in Shadow Prices contributes to a significant divergence in LMPs at any Eligible PNode and/or Eligible Aggregated PNode, the CAISO will determine that virtual bidding causes or contributes to an unwarranted divergence in Shadow Prices.

39.11.2.3 Procedures Regarding Suspension or Limitation

(a) Whenever practicable, prior to suspending or limiting virtual bidding, the CAISO will notify affected Scheduling Coordinators and affected Convergence Bidding Entities that the CAISO intends to suspend or limit virtual bidding and will confer and exchange information with the affected Scheduling Coordinators and affected Convergence Bidding Entities in an effort to resolve any dispute as to whether suspension or limitation of virtual bidding is warranted. In cases where taking such actions prior to suspending or limiting virtual bidding is not practicable, the CAISO will promptly notify the affected Scheduling Coordinators and affected Convergence Bidding Entities that the CAISO has suspended or limited virtual bidding, and will promptly confer and exchange information with the affected Scheduling Coordinators and affected Convergence Bidding Entities in an effort to resolve any dispute as to whether suspension or limitation of virtual bidding is warranted. Within two (2) Business Days of the notice of suspension or limitation, the CAISO will provide the affected Scheduling Coordinators and affected Convergence Bidding Entities with information justifying the decision to suspend or limit virtual bidding.

(b) The CAISO will submit to FERC supporting documentation, including any information provided to the CAISO by the affected Scheduling Coordinators and affected Convergence Bidding Entities, within ten (10) Business Days after any suspension or limitation of virtual bidding begins, unless the CAISO concludes prior to the end of the ten (10) Business Day period that the suspension or limitation of virtual bidding was or is not warranted. The CAISO will provide the affected Scheduling Coordinators and affected Convergence Bidding Entities with a copy of any supporting documentation submitted to FERC.

(c) Suspension or limitation of virtual bidding by the CAISO will remain in effect for ninety (90) days after the CAISO submits its initial supporting documentation to FERC, unless FERC directs otherwise or the CAISO determines that the suspension or limitation of virtual bidding should continue for fewer than ninety (90) days. After the ninety (90) day period expires, the suspension or limitation of virtual bidding will remain in effect only if FERC permits or requires it to remain in effect.

(d) The CAISO will maintain the confidentiality of the identities of the affected Scheduling Coordinators and affected Convergence Bidding Entities until such time as FERC concludes that the circumstances or the conduct of the affected Scheduling Coordinators and affected Convergence Bidding Entities warranted suspension or limitation of virtual bidding.

(e) The CAISO will have the authority to discontinue the suspension or limitation of virtual bidding at any time it determines such suspension or limitation is no longer appropriate and will notify FERC if such suspension or limitation of virtual bidding is discontinued after supporting information concerning such suspension or limitation has been submitted to FERC.

BCR	Bid Cost Recovery
Bid	Either (1) an offer for the Supply or Demand of Energy or Ancillary Services, including Self-Schedules, submitted by Scheduling Coordinators for specific resources, conveyed through several components that apply differently to the different types of service offered to or demanded from any of the CAISO Markets; or (2) a Virtual Bid.
Bid Adder	A dollar amount added to the Bid of a Frequently Mitigated Unit.
Bid Cost Recovery (BCR)	The CAISO settlements process through which Eligible Resources recover their Bid Costs.
Bid Cost Recovery Eligible Resources (BCR Eligible Resources)	Those resources eligible to participate in the Bid Cost Recovery as specified in Section 11.8, which include Generating Units, System Units, System Resources, and Participating Loads.
Bid Costs	The costs for resources manifested in the Bid components submitted, which include the Start-Up Cost, Minimum Load Cost, Energy Bid Cost, Pump Shut-Down Cost, Pumping Cost, Ancillary Services Bid Cost and RUC Availability Payment.
Black Start	The procedure by which a Generating Unit self-starts without an external source of electricity thereby restoring a source of power to the CAISO Balancing Authority Area following system or local area blackouts.
Black Start Generator	A Participating Generator in its capacity as party to an Interim Black Start Agreement with the CAISO for the provision of Black Start services, but shall exclude Participating Generators in their capacity as providers of Black Start services under their Reliability Must-Run Contracts.
BPM	Business Practice Manual
BPM PRR	Business Practice Manual Proposed Revision Request
Bulk Supply Point	A Utility Distribution Company or Small Utility Distribution Company metering point.
Business Associate	Any entity with whom the CAISO interacts related to the CAISO Markets.

CAISO-WECC Billing Services Agreement	The agreement between the CAISO and the WECC entered into by those parties in August 2007, as it may be amended from time to time, regarding the CAISO's performance of certain billing services to facilitate the WECC's collection of NERC/WECC Charges.
Calculated Energy Bid	The Energy Bid utilized in the IFM and RTM on behalf of a COG calculated by dividing its Minimum Load Cost by the MW quantity of its PMax.
Candidate CRR Holder	An entity that is registered and qualified by the CAISO to participate in the CRR Allocation, the CRR Auction, or the Secondary Registration System to become a CRR Holder and is a party to a fully executed CRR Entity Agreement, and therefore must comply with the requirements for Candidate CRR Holders under the CAISO Tariff.
Capacity Benefit Margin (CBM)	The factor defined in Appendix L.
CBEA	Convergence Bidding Entity Agreement
CBM	Capacity Benefit Margin
CCR	Competitive Constraints Run
CDWR-SWP	The California Department of Water Resources, State Water Project.
CDWR-SWP Participating Generating Units	The Generating Units operated by the California Department of Water Resources, State Water Project, that are subject to a Participating Generator Agreement with the CAISO.
CEC	The California Energy Commission or its successor.
Certificate of Compliance	A certificate issued by the CAISO which states that the Metering Facilities referred to in the certificate satisfy the certification criteria for Metering Facilities contained in the CAISO Tariff.
C.F.R.	Code of Federal Regulations.
Charge Code	A numeric identifier used to specify Settlement calculations in the Business Practice Manual.
Clean Bid	A valid Bid submitted by a Scheduling Coordinator that requires no modification, a Default Modified Bid, or a Generated Bid deemed to be acceptable for submission to the CAISO Market applications.
Clustering	The process whereby a group of Interconnection Requests is studied together, instead of serially, for the purpose of conducting the Interconnection System Impact Study.
COG	Constrained Output Generator

Control Area	Balancing Authority Area
Control Area Gross Load	Balancing Authority Area Gross Load
Control Area Operator	Balancing Authority
Convergence Bidding Entity (CBE)	An entity which has undertaken in writing by execution of a Convergence Bidding Entity Agreement to comply with all applicable provisions of the CAISO Tariff.
Convergence Bidding Entity Agreement (CBEA)	An agreement between the CAISO and a Convergence Bidding Entity, a pro forma version of which is set forth in Appendix B.
Converted Rights	Those transmission service rights as defined in Section 4.3.1.6.
Core Reliability Services – Demand Charge	The component of the Grid Management Charge that provides for the recovery of the CAISO's costs of providing a basic, non-scalable level of reliable operation for the CAISO Balancing Authority Area and meeting regional and national reliability requirements. The formula for determining the Core Reliability Services – Demand Charge is set forth in Appendix F, Schedule 1, Part A.

DSHBAOA	Dynamic Scheduling Host Balancing Authority Operating Agreement
Dynamic Resource-Specific System Resource	A Dynamic System Resource that is a specific generation resource outside the CAISO Balancing Authority Area.
Dynamic Schedule	A telemetered reading or value which is updated in Real-Time and which is used as an Interchange Schedule in the CAISO Energy Management System calculation of Area Control Error and the integrated value of which is treated as an Interchange Schedule for Interchange accounting purposes.
Dynamic Scheduling Agreement for Scheduling Coordinators	An agreement between the CAISO and a Scheduling Coordinator regarding the terms by which a Scheduling Coordinator may submit Dynamic Schedules, a pro forma version of which is set forth in Appendix B.5.
Dynamic Scheduling Host Balancing Authority Operating Agreement (DSHBAOA)	An agreement entered into between the CAISO and a Host Balancing Authority governing the terms of dynamic scheduling between the Host Balancing Authority and the CAISO in accordance with the Dynamic Scheduling Protocol set forth in Appendix X, a pro forma version of which agreement is set forth in Appendix B.9
Dynamic System Resource	A System Resource that has satisfied the CAISO's contractual and operational requirements for submitting a Dynamic Schedule, and for which a Dynamic Schedule has been submitted, including a Dynamic Resource-Specific System Resource.
E&P Agreement	Engineering & Procurement Agreement
EAL	Estimated Aggregate Liability
Economic Bid	A Bid that includes quantity (MWh or MW) and price ($) for specified Trading Hours.
Economic Planning Study	A study performed to provide a preliminary assessment of the potential cost effectiveness of mitigating specifically identified Congestion.
EEP	Electrical Emergency Plan
Effective Economic Bid	An Economic Bid that is not an Ineffective Economic Bid.
ELC Process	Extremely Long-Start Commitment Process
Electrical Emergency Plan (EEP)	A plan to be developed by the CAISO in consultation with Utility Distribution Companies to address situations when Energy reserve margins are forecast to be below established levels.

Electric Facility	An electric resource, including a Generating Unit, System Unit, or a Participating Load.
Eligible Aggregated PNode	An Aggregated PNode located at an Intertie where virtual bidding is permitted, or an Aggregated PNode where either aggregated physical supply, a Default LAP, or a Trading Hub are located and where virtual bidding is permitted.
Eligible Capacity	Capacity of Generating Units, System Units, System Resources, or Participating Load that is not already under a contract to be a Resource Adequacy Resource, is not under an RMR Contract or is not currently designated as ICPM Capacity that effectively resolves a procurement shortfall or reliability concern and thus is eligible to be designated under the ICPM in accordance with Section 43.1.
Eligible Customer	(i) any utility (including Participating TOs, Market Participants and any power marketer), Federal power marketing agency, or any person generating Energy for sale or resale; Energy sold or produced by such entity may be Energy produced in the United States, Canada or Mexico; however, such entity is not eligible for transmission service that would be prohibited by Section 212(h)(2) of the Federal Power Act; and (ii) any retail customer taking unbundled transmission service pursuant to a state retail access program or pursuant to a voluntary offer of unbundled retail transmission service by the Participating TO.
Eligible Intermittent Resource	A Generating Unit 1 MW or larger subject to a Participating Generator Agreement or QF PGA that is powered by wind or solar energy, except for a de minimis amount of Energy from other sources.
Eligible PNode	A PNode located at an Intertie where virtual bidding is permitted, or a PNode where either physical supply or demand is located and where virtual bidding is permitted.
ELS Resource	Extremely Long-Start Resource
Emissions Cost Demand	The level of Demand specified in Section 11.18.3.
Emissions Cost Invoice	The invoice submitted to the CAISO in accordance with Section 11.18.6.
Emissions Costs	The mitigation fees, excluding capital costs, assessed against a Generating Unit by a state or federal agency, including air quality districts, for exceeding applicable NOx emission limitations.
Emissions Eligible Generator	A Generator with a Generating Unit that is a BCR Eligible Resource.
EMS	Energy Management System

Encumbrance	A legal restriction or covenant binding on a Participating TO that affects the operation of any transmission lines or associated facilities and which the CAISO needs to take into account in exercising Operational Control over such transmission lines or associated facilities if the Participating TO is not to risk incurring significant liability. Encumbrances shall include Existing Contracts and may include: (1) other legal restrictions or covenants meeting the definition of Encumbrance and arising under other arrangements entered into before the CAISO Operations Date, if any; and (2) legal restrictions or covenants meeting the definition of Encumbrance and arising under a contract or other arrangement entered into after the CAISO Operations Date.
End-Use Customer or End-User	A consumer of electric power who consumes such power to satisfy a Load directly connected to the CAISO Controlled Grid or to a Distribution System and who does not resell the power.
End-Use Meter	A metering device collecting Meter Data with respect to the Energy consumption of an End-User.
End-Use Meter Data	Meter Data that measures the Energy consumption in respect of End-Users gathered, edited and validated by Scheduling Coordinators and submitted to the CAISO in Settlement quality form.
Energy	The electrical energy produced, flowing or supplied by generation, transmission or distribution facilities, being the integral with respect to time of the instantaneous power, measured in units of watt-hours or standard multiples thereof, e.g., 1,000 Wh=1kWh, 1,000 kWh=1MWh, etc.
Energy Bid	A Demand Bid, an Energy Supply Bid, or a Virtual Bid.
Energy Bid Cost	An amount equal to the integral of the Energy Bid for resources that have been selected through the IFM or RTM, above PMin.

ERA	Energy Resource Area
Estimated Aggregate Liability (EAL)	The sum of a Market Participant's or CRR Holder's known and reasonably estimated potential liabilities for a specified time period arising from charges described in the CAISO Tariff, as provided for in Section 12.
Estimated RMR Invoice	The monthly invoice issued by the RMR Owner to the CAISO for estimated RMR Payments or RMR Refunds pursuant to the RMR Contract.
E-Tag	An electronic tag associated with an Interchange schedule in accordance with the requirements of WECC.
ETC	Existing Transmission Contract
ETC Self-Schedule	A Self-Schedule submitted by a Scheduling Coordinator pursuant to Existing Rights as reflected in the TRTC Instructions.
Exceptional Dispatch	A Dispatch Instruction issued for the purposes specified in Section 34.9. Energy from Exceptional Dispatches shall not set any Dispatch Interval LMP.
Exceptional Dispatch Energy	Extra-marginal IIE, exclusive of Standard Ramping Energy, Ramping Energy Deviation, Residual Imbalance Energy, MSS Load Following Energy, Real-Time Minimum Load Energy, and Derate Energy, produced or consumed due to Exceptional Dispatch Instructions that are binding in the relevant Dispatch Interval. Without MSS Load following, Exceptional Dispatch Energy is produced above the LMP index and below the lower of the Dispatch Operating Point or the Exceptional Dispatch Instruction, or consumed below the LMP index and above the higher of the Dispatch Operating Point or the Exceptional Dispatch Instruction. The LMP index is the capacity in the relevant Energy Bid that corresponds to a Bid price equal to the relevant LMP. Exceptional Dispatch Energy does not overlap with Standard Ramping Energy, Ramping Energy Deviation, Residual Imbalance Energy, Real-Time Minimum Load Energy, Derate Energy, or Optimal Energy, but it may overlap with Day-Ahead Scheduled Energy, HASP Scheduled Energy, and MSS Load Following Energy. Exceptional Dispatch Energy is settled as described in Section 11.5.6, and it is not included in BCR as described in Section 11.8.4.
Exceptional Dispatch ICPM	An Exceptional Dispatch ICPM under Section 43.1.5 with a term of 30 days.

Flow Impact The combined impact of the CRR Holder's portfolio of Virtual Awards from the IFM on the power flows of a Constraint. The Flow Impact is calculated by multiplying the CRR Holder's Virtual Awards at a Node by the shift factor of that Node relative to the Constraint. This product is computed for each Node for which the Convergence Bidding Entity had Virtual Awards, and the Flow Impact is the sum of those products. In this definition, shift factor means the factor to be applied to a resource's expected change in output to determine the amount of flow contribution that change in output will impose on an identified transmission facility or flowgate.

Market Notice	An electronic notice issued by the CAISO that the CAISO posts on the CAISO Website and provides by e-mail to those registered with the CAISO to receive CAISO e-mail notices.
Market Participant	An entity, including a Scheduling Coordinator, who either: (1) participates in the CAISO Markets through the buying, selling, transmission, or distribution of Energy, Capacity, or Ancillary Services into, out of, or through the CAISO Controlled Grid; (2) is a CRR Holder or Candidate CRR Holder; or (3) is a Convergence Bidding Entity.
Market Power Mitigation-Reliability Requirement Determination (MPM-RRD)	The two-optimization run process conducted in both the Day-Ahead Market and the HASP that determines the need for the CAISO to employ market power mitigation measures or Dispatch RMR Units.
Market Surveillance Committee (MSC)	The committee established under Appendix P.2.
Market Usage Charge	The component of the Grid Management Charge that provides for the recovery of the CAISO's costs, including, but not limited to the costs for processing Day-Ahead, Hour-Ahead Scheduling Process and Real-Time Bids, maintaining the Open Access Same-Time Information System, monitoring market performance, ensuring generator compliance with market rules as defined in the CAISO Tariff and the Business Practice Manuals, and determining LMPs. The formula for determining the Market Usage Charge is set forth in Appendix F, Schedule 1, Part A.
Market Violation	A CAISO Tariff violation, violation of a Commission-approved order, rule or regulation, market manipulation, or inappropriate dispatch that creates substantial concerns regarding unnecessary market inefficiencies.
Master File	A file containing information regarding Generating Units, Loads and other resources, or its successor.

NERC/WECC Charges	The charges approved by FERC, pursuant to Section 215 of the FPA and FERC issuances related thereto, that provide funding for the statutory-related functions performed by NERC, the WECC, and regional advisory bodies that serve the WECC, or their successors or assignees.
NERC/WECC Charge Trust Account	An account to be established by the CAISO for the purpose of maintaining funds collected from Scheduling Coordinators and disbursing such funds to the WECC.
NERC/WECC Metered Demand	For purposes of calculating NERC/WECC Charges, a Scheduling Coordinator's net metered CAISO Demand plus Unaccounted for Energy for net metered CAISO Demand and Transmission Losses for metered CAISO Demand. A Scheduling Coordinator's net metered CAISO Demand equals the Scheduling Coordinator's metered CAISO Demand (which adds Energy associated with imports from and subtracts Energy associated with exports to other Balancing Authority Areas), less metered CAISO Demand for Station Power and for Energy required for storage at electric energy storage facilities, such as pumped storage. For purposes of calculating NERC/WECC Metered Demand, Unaccounted for Energy and Transmission Losses allocable to net metered CAISO Demand will be allocated pro rata to each Scheduling Coordinator based on the Scheduling Coordinator's net metered CAISO Demand.
Net Assets	For governmental and not-for-profit entities, as defined in Step 4(b) of Section 12.1.1.1.2.
Net Hourly Energy Charge	Total charges to all Demand and Virtual Demand Awards minus total payments to all Supply and Virtual Supply Awards both based on the product of MWh amounts specified in all Day-Ahead Schedules and Virtual Awards and the relevant Day-Ahead LMPs at the applicable PNodes or Aggregated Pricing Node. This also includes any amounts associated with price corrections for Virtual Awards in accordance with Section 11.21.2.

RAS	Remedial Action Schemes
Rated Governmental Entity	A municipal utility or state or federal agency that holds an issuer, counterparty, or underlying credit rating by a Nationally Recognized Statistical Rating Organization.
Rated Public/Private Corporation	An investor-owned or privately held entity that holds an issuer, counterparty, or underlying credit rating by a Nationally Recognized Statistical Rating Organization.
Real-Time	The period of time during the Operating Hour. Any time period during the twenty-four Operating Hours of any given day.
Real-Time Congestion Offset	For each Settlement Period of the HASP and RTM, the CAISO shall calculate the Real-Time Congestion Offset as the difference of 1) the sum of the products of the total of the Demand Imbalance Energy and Virtual Supply liquidated as demand in the RTM or HASP, and the RTM or HASP MCC at the relevant Location; and 2) the sum of the products of the total of the Supply Imbalance Energy and Virtual Demand liquidated as supply in the RTM or HASP, and the RTM or HASP MCC at the relevant Location; including also the sum of RTM and HASP Congestion Charges for Intertie Ancillary Services Awards, and excluding the HASP and RTM Congestion Credit for ETCs and TORs calculated as provided in Section 11.5.7.1. The Real-Time Congestion Offset is allocated as provided in Section 11.5.4.2.
Real-Time Contingency Dispatch (RTCD)	The mode of the Real-Time Dispatch that will be invoked when a transmission or generation Contingency occurs and will include all Contingency Only Operating Reserves in the optimization.
Real-Time Dispatch (RTD)	The SCED and SCUC software used by the CAISO to determine which Ancillary Service and Imbalance Energy resources to Dispatch and to calculate LMPs.

Utility Distribution Company (UDC)	An entity that owns a Distribution System for the delivery of Energy to and from the CAISO Controlled Grid, and that provides regulated retail electric service to Eligible Customers, as well as regulated procurement service to those End-Use Customers who are not yet eligible for direct access, or who choose not to arrange services through another retailer.
Utility Distribution Company Operating Agreement (UDCOA)	An agreement between the CAISO and a Utility Distribution Company, a *pro forma* version of which is set forth in Appendix B.8.
Validation, Estimation and Editing (VEE)	The procedures set forth in Section 10 that the CAISO applies to Revenue Quality Meter Data in order to develop Settlement Quality Meter Data.
Variable Cost	The cost associated with fuel cost and variable operations and maintenance costs.
Variable Cost Option	A method of calculation Default Energy Bids based on fuel costs and variable operations and maintenance costs.
VEE	Validation, Estimation and Editing
Verified CRR Source Quantity	The MW amount corresponding to a verified CRR Source and the LSE or OBAALSE that submitted that verified CRR Source to the CAISO, as described in Section 36.8.3.4.
Virtual Award	A Virtual Supply Award or a Virtual Demand Award.
Virtual Award Charge	The component of the Grid Management Charge that provides for the recovery of the CAISO's costs related to Virtual Awards. The methodology for determining the Virtual Award Charge is set forth in Appendix F, Schedule 1, Part A.
Virtual Bid	A Virtual Supply Bid or a Virtual Demand Bid.

Virtual Bid Curve	The Virtual Bid component that indicates the prices and related quantities at which a Virtual Supply Bid or a Virtual Demand Bid is submitted. For a Virtual Supply Bid, the Virtual Bid Curve is a monotonically increasing staircase function, consisting of no more than ten (10) segments defined by eleven (11) pairs of MW operating points and $/MWh, which may be different for each Trading Hour of the applicable Virtual Bid time period. For a Virtual Demand Bid, the Virtual Bid Curve is a monotonically decreasing staircase function, consisting of no more than ten (10) segments defined by eleven (11) pairs of MW operating points and $/MWh, which may be different for each Trading Hour of the applicable Virtual Bid time period.
Virtual Bid Reference Price	The price set forth in Section 12.8.2.
Virtual Bid Submission Charge	A charge assessed to a Scheduling Coordinator for each submitted Virtual Bid segment that is passed to the IFM.
Virtual Demand Award	The cleared Virtual Demand Bids in the IFM for a given hour.
Virtual Demand Bid	A Bid submitted in the DAM that, if cleared in the IFM, represents a commitment to pay for Energy at the LMP in the DAM and to receive revenues as specified in Section 11.3.
Virtual Supply Award	The cleared Virtual Supply Bids in the IFM for a given hour.
Virtual Supply Bid	A Bid submitted in the DAM that, if cleared in the IFM, represents a commitment to receive revenues for Energy at the LMP in the DAM and to make payments as specified in Section 11.3.
Voltage Limits	For all substation busses, the normal and post Contingency Voltage Limits (kV). The bandwidth for normal Voltage Limits must fall within the bandwidth of the post Contingency Voltage Limits. Special voltage limitations for abnormal operating conditions such as heavy or light Demand may be specified.
Voltage Support	Services provided by Generating Units or other equipment such as shunt capacitors, static var compensators, or synchronous condensers that are required to maintain established grid voltage criteria. This service is required under normal or System Emergency conditions.

CAISO TARIFF APPENDIX B.15

Convergence Bidding Entity Agreement

CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

AND

[CONVERGENCE BIDDING ENTITY]

CONVERGENCE BIDDING ENTITY AGREEMENT

CONVERGENCE BIDDING ENTITY AGREEMENT

THIS AGREEMENT is dated this _____ day of _____, _____, and is entered into, by and between:

(1) **[Full Legal Name]** having its registered and principal place of business located at **[Address]** (the "Convergence Bidding Entity");

and

(2) **California Independent System Operator Corporation,** a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate, initially 151 Blue Ravine Road, Folsom, California 95630 (the "CAISO").

The Convergence Bidding Entity and the CAISO are hereinafter referred to individually as a "Party" and collectively as the "Parties."

Whereas:

A. The CAISO Tariff provides that any entity that intends to submit Virtual Bids (which can only be submitted through a Scheduling Coordinator that is either the entity itself or a representative of the entity) must register and qualify with the CAISO and comply with the terms of the CAISO Tariff.

B. The Convergence Bidding Entity has completed the Convergence Bidding Entity application process and is eligible to submit Virtual Bids.

C. The CAISO Tariff further provides that any entity who wishes to submit Virtual Bids must meet all of the Convergence Bidding Entity requirements in the CAISO Tariff and the relevant Business Practice Manual.

D. The Convergence Bidding Entity intends to submit Virtual Bids and, therefore, wishes to undertake to the CAISO that it will comply with the applicable provisions of the CAISO Tariff.

E. The Parties are entering into this Agreement in order to establish the terms and conditions pursuant to which the CAISO and the Convergence Bidding Entity will discharge their respective duties and responsibilities under the CAISO Tariff.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, **THE PARTIES AGREE** as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

1.1 Master Definitions Supplement. All terms and expressions used in this Agreement shall have the same meanings as those contained in the Master Definitions Supplement in Appendix A of the CAISO Tariff.

1.2 Rules of Interpretation. The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) “includes” or “including” shall mean “including without limitation”;

(e) references to a Section, Article, or Schedule shall mean a Section, Article, or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

(f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented, or restated through the date as of which such reference is made;

(g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced, or restated from time to time;

(h) unless the context otherwise requires, any reference to a “person” includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization, or other entity, in each case whether or not having separate legal personality;

(i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;

(j) any reference to a day, week, month, or year is to a calendar day, week, month, or year; and

(k) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

ARTICLE II

ACKNOWLEDGEMENTS OF CONVERGENCE BIDDING ENTITY AND CAISO

2.1 Scope of Application to Parties. The Convergence Bidding Entity and CAISO acknowledge that all Convergence Bidding Entities must sign a form of this Agreement in accordance with Section 4.14 of the CAISO Tariff.

ARTICLE III

TERM AND TERMINATION

3.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by both Parties or the date accepted for filing and made effective by FERC, if such FERC filing is required, and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

3.2 Termination

3.2.1 Termination by CAISO. Subject to Article V, the CAISO may terminate this Agreement by giving written notice to the Convergence Bidding Entity of termination in the event that the Convergence Bidding Entity commits any material default under this Agreement and/or the CAISO Tariff as it pertains to this Agreement which, if capable of being remedied, is not remedied within the time frame specified in the CAISO Tariff after the CAISO has given written notice of the material default to the Convergence Bidding Entity. The CAISO will not terminate this Agreement if the material default of the Convergence Bidding Entity is excused by reason of Uncontrollable Forces in accordance with Article X of this Agreement or if the CAISO agrees, in writing, to an extension of the time to remedy such material default. Any outstanding financial right or obligation or any other obligation under the CAISO Tariff of the Scheduling Coordinator that represents the Convergence Bidding Entity that has arisen while that Scheduling Coordinator was submitting Virtual Bids, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive until satisfied. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the filing of the notice of termination is made after the preconditions for termination have been met and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if filed with FERC, or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.2.2 Termination by Convergence Bidding Entity. In the event that the Convergence Bidding Entity no longer intends to submit Virtual Bids, it may terminate this Agreement, on giving the CAISO not less than ninety (90) days' written notice; provided, however, that any outstanding financial right or obligation or any other obligation under the CAISO Tariff of the Scheduling Coordinator that represents the Convergence Bidding Entity that has arisen while that Scheduling Coordinator was submitting Virtual Bids, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive until satisfied. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met and the CAISO files the notice of termination within sixty (60) days after receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the Convergence Bidding Entity's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

ARTICLE IV

GENERAL TERMS AND CONDITIONS

4.1 Convergence Bidding Entity Requirements. The Convergence Bidding Entity must register and qualify with the CAISO and comply with all terms of the CAISO Tariff applicable to Convergence Bidding Entities.

4.2 Electronic Contracting. All submitted applications, bids, confirmations, changes to information on file with the CAISO and other communications conducted via electronic transfer (e.g., direct computer link, FTP file transfer, bulletin board, e-mail, facsimile or any other means established by the CAISO) shall have the same legal rights, responsibilities, obligations and other implications as set forth in the terms and conditions of the CAISO Tariff as if executed in written format.

4.3 Agreement Subject to CAISO Tariff. The Parties will comply with all applicable provisions of the CAISO Tariff. This Agreement shall be subject to the CAISO Tariff, which shall be deemed to be incorporated herein.

ARTICLE V

PERFORMANCE

5.1 Penalties. The Convergence Bidding Entity shall be subject to all penalties made applicable to Convergence Bidding Entities set forth in the CAISO Tariff. Nothing in this Agreement, with the exception of the provisions relating to the CAISO ADR Procedures, shall be construed as waiving the rights of the Convergence Bidding Entity to oppose or protest the specific imposition by the CAISO of any FERC-approved penalty on the Convergence Bidding Entity.

5.2 Corrective Measures. If the Convergence Bidding Entity fails to meet or maintain the requirements set forth in this Agreement and/or the CAISO Tariff, the CAISO shall be permitted to take any of the measures, contained or referenced in the CAISO Tariff, which the CAISO deems to be necessary to correct the situation.

ARTICLE VI
COSTS

6.1 Operating and Maintenance Costs. The Convergence Bidding Entity shall be responsible for all its costs incurred in connection with all its activities related to submittal of Virtual Bids.

ARTICLE VII

DISPUTE RESOLUTION

7.1 Dispute Resolution. The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the Convergence Bidding Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VIII

REPRESENTATIONS AND WARRANTIES

8.1 Representation and Warranties. Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

ARTICLE IX

LIABILITY

9.1 Liability. The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the Convergence Bidding Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE X

UNCONTROLLABLE FORCES

10.1 Uncontrollable Forces Tariff Provisions. Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the Convergence Bidding Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE XI

MISCELLANEOUS

11.1 Assignments. Either Party may assign or transfer any or all of its rights and/or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and other CAISO Tariff requirements as applied to Convergence Bidding Entities. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest was an original Party to this Agreement.

11.2 Notices. Any notice, demand, or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the Convergence Bidding Entity and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes to Schedule 1 shall not constitute an amendment to this Agreement.

11.3 Waivers. Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

11.4 Governing Law and Forum. This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply, shall be brought in any of the following forums, as appropriate: (i) any court of the State of California, (ii) any federal court of the United States of America located in the State of California, except to the extent subject to the protections of the Eleventh Amendment of the United States Constitution or, (iii) where subject to its jurisdiction, before FERC.

11.5 Consistency with Federal Laws and Regulations. This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

11.6 Merger. This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

11.7 Severability. If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

11.8 Amendments. This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing herein shall be construed as affecting in any way the right of the CAISO to make unilateral application to FERC for a change in the rates, terms, and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the Convergence Bidding Entity shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein. The standard of review FERC shall apply when acting upon proposed modifications to this Agreement by the CAISO shall be the "just and reasonable" standard of review rather than the "public interest" standard of review. The standard of review FERC shall apply when acting upon proposed modifications to this Agreement by FERC's own motion or by a signatory other than the CAISO or non-signatory entity shall also be the "just and reasonable" standard of review. Schedule 1 is provided for informational purposes and revisions to that schedule do not constitute a material change in the Agreement warranting FERC review.

11.9 Counterparts. This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

California Independent System Operator Corporation

By: _____

Name: _____

Title: _____

Date: _____

[Name of Convergence Bidding Entity]

By: _____

Name: _____

Title: _____

Date: _____

SCHEDULE 1

NOTICES

[Section 11.2]

Convergence Bidding Entity

Name of Primary Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

CAISO

Name of Primary Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email address: _____

Phone: _____

Fax: _____

Name of Alternative Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email address: _____

Phone: _____

Fax: _____

CAISO TARIFF APPENDIX F
Schedule 1

Grid Management Charge

Part A – Monthly Calculation of Grid Management Charge (GMC)

The Grid Management Charge consists of the following separate service charges: (1) the Core Reliability Services – Demand Charge, (2) the Core Reliability Services – Energy Exports Charge; (3) Energy Transmission Services – Net Energy Charge, (4) the Energy Transmission Services – Uninstructed Deviations Charge, (5) the Core Reliability Services/Energy Transmission Services – Transmission Ownership Rights Charge, (6) the Forward Scheduling Charge, (7) the Market Usage Charge, (8) the Settlements, Metering, and Client Relations Charge, and (9) the Virtual Award Charge.

1. The rate in $/MW for the Core Reliability Services – Demand Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the total of the forecasted Scheduling Coordinators' metered non-coincident peak hourly demand in MW for all months during the year (excluding the portion of such Demand associated with Energy Exports, if any, as may be modified in accordance with Part F of this Schedule 1), reduced by thirty-four percent (34%) of the sum of all Scheduling Coordinators' metered non-coincident peak Demands occurring during the hours ending 0100 through 0600, or during the hours ending 2300 through 2400, every day, including Sundays and holidays; provided that if a Scheduling Coordinator's metered non-coincident peak Demand hour during the month occurs during the hours ending 0100 through 0600, or during the hours ending 2300 through 2400, every day, the rate shall be sixty-six percent (66%) of the standard Core Reliability Services – Demand Charge rate.

2. The rate in $/MWh for the Core Reliability Services – Energy Exports Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the total of the forecasted Scheduling Coordinators' metered volume of Energy Exports in MWh, excluding each Scheduling Coordinator's Energy Exports associated with Transmission Ownership Rights.

3. The rate in $/MWh for the Energy Transmission Services – Net Energy Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the total annual forecasted Metered Balancing Authority Area Load, excluding each Scheduling Coordinator's Metered Balancing Authority Area Load associated with Transmission Ownership Rights.

4. The rate in $/MWh for the Energy Transmission Services – Uninstructed Deviations Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the absolute value of total annual forecasted net Uninstructed Imbalance Energy (netted within a Settlement Interval summed over the calendar month) in MWh; provided that the rate for each Scheduling Coordinator's Participating Intermittent Resources will be assessed against the Uninstructed Imbalance Energy of such Participating Intermittent Resources netted over the Trading Month.

5. The rate in $/MWh for the Core Reliability Services/Energy Transmission Services – Transmission Ownership Rights Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the total annual forecasted Metered Balancing Authority Area Load associated with Transmission Ownership Rights.

6. The rate in $ per Schedule or $ per Inter-SC Trade for the Forward Scheduling Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the annual forecasted number of non-zero MW Day-Ahead and HASP Schedules, as may be modified in accordance with Part F of this Schedule 1, including all awarded Ancillary Service and Residual Unit Commitment Bids and all Inter-SC Trades, including Inter-SC Trades of IFM Load Uplift Obligations. This charge will be assessed separately with respect to Schedules and Inter-SC Trades.

7. The rate in $/MWh for the Market Usage Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the annual forecasted total purchases and sales (including out-of-market transactions) of Ancillary Services, Energy, Instructed Imbalance Energy, and net Uninstructed Imbalance Energy (with Uninstructed Imbalance Energy for Participating Intermittent Resources netted over the Trading Month and all other Uninstructed Imbalance Energy being netted within a Settlement Interval) in MWh. A Market Usage Charge rate will be calculated separately for two sets of CAISO Markets: (i) the Ancillary Services and RTM rate will be based on MWh of purchases and sales of Ancillary Services in the DAM, the HASP, and the RTM, MWh of Instructed Imbalance Energy, and MWh of Uninstructed Imbalance Energy netted over the Settlement Interval; and (ii) the rate for the Day-Ahead Market for Energy will be based on MWh of Day-Ahead Schedules. The rate for the Day-Ahead Market for Energy will be based on the sum, for all Scheduling Coordinators and all Settlement Periods, of the greater of the amount of MWh associated with each Scheduling Coordinator's Day-Ahead Schedule of Supply or the amount associated with its Day-Ahead Schedule of Demand for each Settlement Period.

8. The rate for the Settlements, Metering, and Client Relations Charge will be fixed at $1000.00 per month, per Scheduling Coordinator ID Code (SCID) with an invoice value other than $0.00 in the current Trading Month.

9. The rate in $/MWh for the Virtual Award Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the annual forecasted total virtual supply and virtual demand cleared in the IFM. This service category will be allocated a percentage of the Forward Scheduling Charge and Market Usage – Forward Energy service categories based upon the total annual forecasted cleared supply and demand. All amounts collected from the assessment of the Virtual Bid Submission Charge in a given year will be used to offset the amount of the Virtual Award Charge for the next year.

For a Scheduling Coordinator for a Load following MSS, the GMC service charges set forth in above shall be applied as set forth in Section 11.22.3 of the CAISO Tariff.

The rates for the foregoing charges shall be adjusted automatically each year, effective January 1 for the following twelve months, in the manner set forth in Part D of this Schedule.

Part B – Quarterly Adjustment, If Required

Each component rate of the Grid Management Charge will be adjusted automatically on a quarterly basis, up or down, so that rates reflect the annual revenue requirement as stated in the CAISO's filing or posting on the CAISO Website, as applicable, if the estimated revenue collections for that component, on an annual basis, change by more than five percent (5%) or $1 million, whichever is greater, during the year. Such adjustment may be implemented not more than once per calendar quarter, and will be effective the first day of the next calendar month.

The rates will be adjusted according to the formulae listed in Appendix F, Schedule 1, Part A with the billing determinant(s) readjusted on a going-forward basis to reflect the change of more than five percent (5%) or $1 million, whichever is greater, from the estimated revenue collections provided in the annual informational filing.

Part C – Costs Recovered through the GMC

As provided in Section 11.22.2 of the CAISO Tariff, the Grid Management Charge includes the following costs, as projected in the CAISO's budget for the year to which the Grid Management Charge applies:

- CAISO Operating Costs;
- CAISO Other Costs and Revenues, including penalties, interest earnings and other revenues;
- CAISO Financing Costs, including debt service on CAISO Start Up and Development Costs and subsequent capital expenditures; and
- CAISO Operating and Capital Reserves Costs.

.

Such costs, for the CAISO as a whole, are allocated to the service charges that comprise the Grid Management Charge: (1) Core Reliability Services - Demand Charge, (2) Core Reliability Services – Energy Exports Charge, (3) Energy Transmission Services – Net Energy Charge, (4) Energy Transmission Services – Uninstructed Deviations Charge, (5) Core Reliability Services/ Energy Transmission Services – Transmission Ownership Rights Charge, (6) Forward Scheduling Charge, (7) Market Usage Charge, (8) Settlements, Metering, and Client Relations Charge, and (9) Virtual Award Charge, according to the factors listed in Part E of this Schedule 1, and

adjusted annually for:

- any surplus revenues from the previous year as deposited in the CAISO Operating and Capital Reserves Account, or deficiency of revenues, as recorded in a memorandum account;

divided by:

- forecasted annual billing determinant volumes;

adjusted quarterly for:

- a change in the volume estimate used to calculate the individual Grid Management Charge components, if, on an annual basis, the change is five percent (5%) or $1 million, whichever is greater, from the estimated revenue collections provided in the annual informational filing.

The Grid Management Charge revenue requirement formula is as follows:

Grid Management Charge revenue requirement =

CAISO Operating Costs + CAISO Financing Costs + CAISO Other Costs and Revenues + CAISO Operating and Capital Reserves Costs,

[The “USoA” reference below is the FERC Uniform System of Accounts, and is intended to include subsequent re-numbering or re-designation of the same accounts or subaccounts.]

Where,

(1) CAISO Operating Costs include:

(a) Transmission expenses (USoA 560-574);

(b) Regional market expenses (USoA 575 subaccounts);

(c) Customer accounting expenses (USoA 901-905);

(d) Customer service and informational expenses (USoA 906-910);

(e) Sales expenses (USoA 911-917);

(f) Administrative & general expenses (USoA 920-935);

(g) Taxes other than income taxes that relate to CAISO operating income (USoA 408.1); and

(h) Miscellaneous, non-operating expenses, penalties and other deductions (USoA 426 subaccounts).

The allocation of costs to cost allocation factors FS and MU-FE includes the allocation of costs to the Virtual Award Charge.

2. The allocation of costs in accordance with Section 1 and Tables 1 and 2 of this Part E shall be adjusted as follows:

Costs allocated to the Energy Transmission Services (ETS) category in the following tables are further apportioned to the Energy Transmission Services – Net Energy Charge and Energy Transmission Services – Uninstructed Deviations Charge subcategories in eighty percent (80%) and twenty percent (20%) ratios, respectively.

Attachment B - Blacklines

Convergence Bidding Amendment

ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

* * *

4.5 Responsibilities of a Scheduling Coordinator.

4.5.1 Scheduling Coordinator Certification.

Only Scheduling Coordinators that the CAISO has certified as having met the requirements of this Section 4.5.1 may participate in the CAISO's Energy and Ancillary Services markets. Scheduling Coordinators offering Ancillary Services shall additionally meet the requirements of Section 8.

Each Scheduling Coordinator shall:

(a) demonstrate to the CAISO's reasonable satisfaction that it is capable of performing the functions of a Scheduling Coordinator under this CAISO Tariff including (without limitation) the functions specified in Sections 4.5.3 and 4.5.4 as applicable;

(b) identify each of the Eligible Customers (including itself if it trades for its own account) which it is authorized to represent as Scheduling Coordinator and confirm that the metering requirements under Section 10 are met in relation to each Eligible Customer that it represents under this CAISO Tariff;

(c) identify each of the Convergence Bidding Entities that it is authorized to represent as Scheduling Coordinator;

(~~c~~d) confirm that each of the End-Use Customers it represents is eligible for service as a Direct Access End User;

(~~d~~e) confirm that none of the Wholesale Customers it represents is ineligible for wholesale transmission service pursuant to the provisions of FPA Section 212(h);

(~~e~~f) demonstrate to the CAISO's reasonable satisfaction that it meets the financial criteria set out in Section 12;

(~~f~~g) enter into a Scheduling Coordinator Agreement with the CAISO; and

(~~g~~h) provide NERC tagging data as applicable.

* * *

4.5.1.1.6.2 Scheduling Coordinator Applicant's Obligation for Contracts.

A Scheduling Coordinator Applicant must certify that it is duly authorized to represent the Generators and Loads that are its Scheduling Coordinator Customers and must further certify that:

(a) represented Generators have entered into Participating Generator Agreements or Qualifying Facility Participating Generator Agreements as provided in Appendices B.2 and B.3, respectively with the CAISO;

(b) represented UDCs have entered into UDC Operating Agreements as provided in Appendix B.8 with the CAISO;

(c) represented CAISO Metered Entities have entered into Meter Service Agreements for CAISO Metered Entities as provided in Appendix B.6 with the CAISO;

(d) none of the Wholesale Customers it will represent are ineligible for wholesale transmission service pursuant to the provisions of the FPA Section 212(h); and

(e) each End-Use Customer it will represent is eligible for service as a Direct Access End User pursuant to an established program approved by the California Public Utilities Commission or a Local Regulatory Authority.

A Scheduling Coordinator Applicant that seeks to serve as Scheduling Coordinator for one or more Convergence Bidding Entities must certify that it is duly authorized to represent those Convergence Bidding Entities and to submit and settle Virtual Bids on their behalf.

* * *

4.5.2 Eligible Customers and Convergence Bidding Entities

4.5.2.1 SCs Representing Eligible Customers ~~Represented by Scheduling Coordinators.~~

Each Scheduling Coordinator shall within ten (10) days of a request by the CAISO provide the CAISO with a list of the Eligible Customers that it represents at the date of the request.

4.5.2.2 SCs Representing Convergence Bidding Entities

Each Scheduling Coordinator that is or represents one or more Convergence Bidding Entities will provide the CAISO with a list of the Convergence Bidding Entities that it represents and the SCIDs that the

Scheduling Coordinator will use to submit Virtual Bids for each Convergence Bidding Entity, at least eleven (11) Business Days prior to the Scheduling Coordinator's initial submission of a Virtual Bid on behalf of any of those Convergence Bidding Entities. This list must satisfy the requirements of Section 4.14.2.3. In the event that the Scheduling Coordinator will represent additional Convergence Bidding Entities or modifies any of the SCIDs that the Scheduling Coordinator will use to submit Virtual Bids on behalf of any Convergence Bidding Entity, the Scheduling Coordinator will provide the CAISO with an updated list of Convergence Bidding Entities and/or SCIDs at least eleven (11) Business Days prior to submitting a Virtual Bid involving a Convergence Bidding Entity and/or SCID not already included in the most recent list provided to the CAISO. The CAISO will incorporate the information provided pursuant to this Section 4.5.2.2 into the CAISO's official list of the Convergence Bidding Entities that Scheduling Coordinators represent and will incorporate the SCIDs that Scheduling Coordinators use to submit Virtual Bids on behalf of Convergence Bidding Entities into the Master File within eleven (11) Business Days after the CAISO determines that the information in each list or updated list provided by a Scheduling Coordinator or Convergence Bidding Entity is accurate and complete.

* * *

4.5.3.7 Annual and Monthly Forecasts.

Submitting to the CAISO its forecasted monthly and annual peak Demand in the CAISO Balancing Authority Area and/or its forecasted monthly and annual Generation capacity, as applicable; the forecasts shall be submitted to the CAISO electronically on a monthly basis by noon of the 18th working day of the month and shall cover a period of twelve (12) months on a rolling basis. Scheduling Coordinators that represent only Convergence Bidding Entities will not be subject to the requirements of this Section 4.5.3.7.

* * *

4.5.3.12 Financial Responsibility.

Assuming financial responsibility for all Schedules, awards, HASP Intertie Schedules and Dispatch Instructions issued in the CAISO Markets, and all Virtual Bids, in accordance with the provisions of this CAISO Tariff; and

* * *

4.5.4 Operations of a Scheduling Coordinator.

4.5.4.1 Maintain Twenty-four (24) Hour Scheduling Centers.

Each Scheduling Coordinator other than a Scheduling Coordinator that represents only Convergence Bidding Entities shall operate and maintain a twenty-four (24) hour, seven (7) days per week, scheduling center. Each Scheduling Coordinator shall designate a senior member of staff as its scheduling center manager who shall be responsible for operational communications with the CAISO and who shall have sufficient authority to commit and bind the Scheduling Coordinator.

* * *

4.14 Relationship Between the CAISO and Convergence Bidding Entities

Only entities that satisfy all of the requirements specified in this Section 4.14 will be certified by the CAISO to be Convergence Bidding Entities and thus be authorized by the CAISO to submit Virtual Bids. A Convergence Bidding Entity may submit Virtual Bids only through a Scheduling Coordinator, which can be either the Convergence Bidding Entity itself or another entity that is a Scheduling Coordinator. A Convergence Bidding Entity may be represented by only one Scheduling Coordinator at any given time.

4.14.1 Procedure to Become a Convergence Bidding Entity

4.14.1.1 Convergence Bidding Entity Application

To become a Convergence Bidding Entity, a Convergence Bidding Entity applicant must submit a completed written application, as provided in the applicable form posted on the CAISO Website, to the CAISO by mail or in person.

4.14.1.2 CAISO Information

The CAISO will provide the following information, in its most current form, on the CAISO Website and, upon request by a Convergence Bidding Entity applicant, the CAISO will send the requested information by electronic mail:

(a) the Convergence Bidding Entity application form; and

(b) the CAISO Tariff and Business Practice Manuals.

4.14.1.3 Convergence Bidding Entity Applicant Submits Application

At least sixty (60) Business Days before the date on or after which the Convergence Bidding Entity applicant proposes to start submitting Virtual Bids, the Convergence Bidding Entity applicant must return a completed application form.

4.14.1.4 Notice of Receipt

Within three (3) Business Days of receiving the application, the CAISO will send written notification to the Convergence Bidding Entity applicant that it has received the application.

4.14.1.5 CAISO Review of Application

Within ten (10) Business Days after receiving an application, the CAISO will notify the Convergence Bidding Entity applicant whether the Convergence Bidding Entity applicant has submitted all necessary information as set forth in Section 4.14.1.

4.14.1.5.1 Information Requirements

The Convergence Bidding Entity applicant must submit with its application:

(a) the proposed date on or after which the Convergence Bidding Entity applicant proposes to start submitting Virtual Bids, which may not be less than sixty (60) Business Days after the date the application was filed, unless waived by the CAISO;

(b) an explanation of whether the Convergence Bidding Entity applicant is a Rated or Unrated Public/Private Corporation, a Rated or Unrated Governmental Entity, a Local Publicly Owned Electric Utility, or another type of entity, and a chart, or equivalent information, depicting the Convergence Bidding Entity applicant's corporate structure, including all parent companies of the Convergence Bidding Entity applicant, all subsidiaries of the Convergence Bidding Entity applicant, and all Affiliates of the Convergence Bidding Entity applicant that meet the requirements of Section 4.14.2.1; and

(c) the name of the Scheduling Coordinator and SCID(s) that the Convergence Bidding Entity anticipates will be used for submitting Virtual Bids on behalf of the Convergence Bidding Entity.

Additional instructions for completing the foregoing requirements will be set forth in the applicable Business Practice Manual(s) posted on the CAISO Website.

4.14.1.6 Deficient Application

In the event that the CAISO determines that the application is deficient, the CAISO will send an electronic notification of the deficiency to the Convergence Bidding Entity applicant within ten (10) Business Days of receipt by the CAISO of the application explaining the deficiency and requesting additional information.

4.14.1.6.1 Additional Information

Once the CAISO requests additional information, the Convergence Bidding Entity applicant has five (5) Business Days, or such longer period as the CAISO may agree not to exceed five (5) additional Business Days, to provide the additional material requested by the CAISO.

4.14.1.6.2 No Response from Convergence Bidding Entity Applicant

If the Convergence Bidding Entity applicant does not submit additional information within five (5) Business Days or the longer period referred to in Section 4.14.1.6.1, the application may be rejected by the CAISO.

4.14.1.7 CAISO Approval or Rejection of an Application

4.14.1.7.1 Approval or Rejection Notification

(a) If the CAISO approves the application, it will send a written notification of approval. In addition, the CAISO will provide an executable Convergence Bidding Entity Agreement.

(b) If the CAISO rejects the application, the CAISO will send an electronic notification of rejection stating one or more of the following grounds:

(i) incomplete information; or

(ii) non-compliance with any other CAISO Tariff requirements.

Upon request, the CAISO will provide guidance as to how the Convergence Bidding Entity applicant can cure the grounds for the rejection.

4.14.1.7.2 Time for Processing Application

The CAISO will make a decision whether to accept or reject the application within ten (10) Business Days of receipt of the application. If more information is requested, the CAISO will make a final decision within ten (10) Business Days of the receipt of all outstanding or additional information requested.

4.14.1.8 Convergence Bidding Entity Applicant's Response

4.14.1.8.1 Convergence Bidding Entity Applicant's Acceptance

If the CAISO accepts the application, the Convergence Bidding Entity applicant must return the partially executed Convergence Bidding Entity Agreement previously provided by the CAISO.

4.14.1.8.2 Convergence Bidding Entity Applicant's Rejection

4.14.1.8.2.1 Resubmittal

If the CAISO rejects the application, the Convergence Bidding Entity applicant may resubmit its application at any time.

4.14.1.8.2.2 Appeal

The Convergence Bidding Entity applicant may also appeal the rejection of an application by the CAISO. An appeal must be submitted within twenty (20) Business Days following the CAISO's issuance of a notification of rejection.

4.14.1.9 Final Certification

The Convergence Bidding Entity applicant will become a Convergence Bidding Entity when:

(a) its application has been accepted;

(b) it has entered into a Convergence Bidding Entity Agreement and any other applicable agreements with the CAISO; and

(c) it has fulfilled all requirements of Section 4.14.1.5.1.

The CAISO will not certify a Convergence Bidding Entity applicant as a Convergence Bidding Entity until the Convergence Bidding Entity applicant has completed all the above-referenced requirements to the CAISO's satisfaction, at least ten (10) Business Days before the commencement of service.

4.14.2 Convergence Bidding Entity's Ongoing Obligations

4.14.2.1 Affiliate Disclosure Requirements

Each Convergence Bidding Entity applicant will notify the CAISO of any Affiliate that is a Market Participant, any Affiliate that participates in an organized electricity market in North America, and any guarantor of any such Affiliate. Upon request, a Convergence Bidding Entity applicant will provide the CAISO with information on each such Affiliate, including information concerning the ownership structure of such Affiliate and the business purpose of such Affiliate. These requirements will continue to apply after a Convergence Bidding Entity applicant becomes a Convergence Bidding Entity.

4.14.2.2 Obligation to Report a Change in Filed Information

Each Convergence Bidding Entity has an ongoing obligation to inform the CAISO of any changes to any of the information submitted by it to the CAISO as part of the application process, including but not limited to any changes to such information after the application is initially submitted, any changes to the additional information requested by the CAISO, and changes regarding its Affiliates that satisfy the requirements of Section 4.14.2.1, within five (5) Business Days of when each such change occurs. The applicable Business Practice Manual sets forth the procedures for changing the Convergence Bidding Entity's information.

4.14.2.3 Identification of SCIDs

Each Convergence Bidding Entity will provide the CAISO with a list of the SCIDs that the Scheduling Coordinator that represents the Convergence Bidding Entity will use to submit Virtual Bids for that Convergence Bidding Entity, at least eleven (11) Business Days prior to the Scheduling Coordinator's submission of a Virtual Bid on behalf of the Convergence Bidding Entity. If there is a subsequent change to the list of the SCIDs that the Scheduling Coordinator will use to submit Virtual Bids on behalf of the Convergence Bidding Entity or the identity of the Scheduling Coordinator that represents the Convergence Bidding Entity, the Convergence Bidding Entity will provide the CAISO with an updated list of SCIDs that the Scheduling Coordinator that represents the Convergence Bidding Entity will use to submit Virtual Bids on behalf of the Convergence Bidding Entity, at least eleven (11) Business Days prior to the Scheduling Coordinator's submittal of a Virtual Bid involving a Convergence Bidding Entity and/or SCID not already included in the most recent list provided to the CAISO. The identification of the Scheduling Coordinator and list of SCIDs provided by the Convergence Bidding Entity and the list of SCIDs provided by the Scheduling Coordinator regarding that Convergence Bidding Entity pursuant to

Section 4.5.2.2 must correspond. In the event these lists do not correspond, the CAISO will inform the applicable Scheduling Coordinator and Convergence Bidding Entity, and the parties will provide revised lists that correspond prior to the Scheduling Coordinator's submission of a Virtual Bid on behalf of that Convergence Bidding Entity. The CAISO will incorporate the information provided pursuant to this Section 4.14.2.3 into the CAISO's official list of the Scheduling Coordinators that are eligible to submit Virtual Bids on behalf of Convergence Bidding Entities and the SCIDs used on their behalf will be incorporated into the Master File within eleven (11) Business Days after the CAISO determines that the information in each list, updated list, or revised list provided by a Scheduling Coordinator or Convergence Bidding Entity is accurate and complete.

4.14.2.4 Failure to Promptly Report a Material Change

If a Convergence Bidding Entity fails to inform the CAISO of a material change in its information provided to the CAISO, the CAISO may limit, suspend, or terminate the Convergence Bidding Entity's rights under the CAISO Tariff and terminate the Convergence Bidding Entity Agreement in accordance with the terms of Sections 4.14.3, 12, and 39.11.2. If the CAISO intends to terminate the Convergence Bidding Entity Agreement, it will file a notice of termination with FERC, if required by FERC rules, in accordance with the terms of the Convergence Bidding Entity Agreement. Such termination will be effective upon acceptance by FERC of a notice of termination, if required by FERC rules, or as otherwise permitted by FERC rules.

4.14.3 Termination of a Convergence Bidding Entity Agreement

(a) A Convergence Bidding Entity Agreement may be terminated by the CAISO on written notice to the Convergence Bidding Entity in accordance with the terms of the Convergence Bidding Entity Agreement:

(i) if the Convergence Bidding Entity no longer meets the requirements for eligibility set out in Section 4.14and fails to remedy the default within a period of seven (7) Business Days after the CAISO has given written notice of the default;

(ii) if the Scheduling Coordinator that represents the Convergence Bidding Entity fails to pay any sum under this CAISO Tariff and fails to remedy

the default within a period of five (5) Business Days after the CAISO has given written notice of the default; or

(iii) if the Convergence Bidding Entity commits any other default under this CAISO Tariff or any of the Business Practice Manuals which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given it written notice of the default.

(b) The Convergence Bidding Entity may terminate the Convergence Bidding Entity Agreement in accordance with the provisions of that agreement.

(c) Upon termination of the Convergence Bidding Entity Agreement, the Scheduling Coordinator that represents the Convergence Bidding Entity will continue to be liable for any outstanding financial or other obligations incurred under the CAISO Tariff as a result of the Convergence Bidding Entity's status as a Convergence Bidding Entity.

(d) The CAISO will, following termination of a Convergence Bidding Entity Agreement and within thirty (30) days of being satisfied that no sums remain owing by the Scheduling Coordinator that represents the Convergence Bidding Entity under the CAISO Tariff, return or release to the Scheduling Coordinator, as appropriate, any Financial Security support provided by such Scheduling Coordinator to the CAISO under Section 12.

* * *

6.5.2.3.6 Virtual Bid Reference Prices

The CAISO will publish Virtual Bid Reference Prices prior to the applicable reference period for the Virtual Bid Reference Prices.

* * *

6.5.6.1 Public Market Information.

6.5.6.1.1 180 Days After Trading Day

The following information shall be published on OASIS 180 days following the applicable Trading Day, with the exclusion of the information that is specific to Scheduling Coordinators:

(a) AS market Bids;

(b) Energy market Bids, including Virtual Bids separately identified as such; and

(c) RUC market Bids.

* * *

7.7.15 System Operations in the Event of a Market Disruption.

7.7.15.1 Actions in the Event of a Market Disruption, to Prevent a Market Disruption or to minimize the Extent of a Market Disruption.

The CAISO may take one or more of the following actions in the event of a Market Disruption, to prevent a Market Disruption, or to minimize the extent of a Market Disruption:

(a) postpone the closure of the applicable CAISO Market;

(b) remove Bids, including Self-Schedules, that have resulted in a Market Disruption previously;

(c) close the applicable CAISO Market and manually copy Bids, including Self-Schedules, from the previous day or other applicable market period;

(d) close the applicable CAISO Market and use submitted Bids, including Self-Schedules, to the extent possible;

(e) cancel the applicable CAISO Market, in which case import/export schedules shall be determined by submittal of E-Tags;

(f) utilize Administrative Prices to settle metered Supply and Demand; and

(g) utilize Exceptional Dispatch and issue operating orders for resources to be committed and dispatched to meet Demand; and

(h) suspend or limit the ability of all Scheduling Coordinators to submit Virtual Bids on behalf of Convergence Bidding Entities at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes.

* * *

11.1.2 Settlement Charges and Payments

The CAISO shall settle the following charges in accordance with this CAISO Tariff: (1) Grid Management Charge; (2) Bid Cost Recovery; (3) IFM charges and payments, including Energy and Ancillary Services; (4) RUC charges and payments; (5) Real-Time Market charges and payments, including Energy and Ancillary Services; (6) HASP charges and payments for Energy; (7) High Voltage Access Charges and TAC Transition Charges; (8) Wheeling Access Charges; (9) Voltage Support and Black Start charges; (10) Excess Cost Payments; (11) default interest charges; (12) CRR Charges and Payments, (13) Inter-SC Trades charges and payments; (14) neutrality adjustments; (15) FERC Annual Charges; (16) distribution of excess Marginal Losses; (17) Virtual Bid Submission Charges; (17~~8~~) miscellaneous charges and payments; and (18~~9~~) Participating Intermittent Resource Fees.

* * *

11.2.4.1 Calculation of the IFM Congestion Charge~~.~~

For each Settlement Period of the IFM, the CAISO shall calculate the IFM Congestion Charge as the IFM MCC amount for all scheduled Demand and Virtual Demand Awards minus the IFM MCC amount for all scheduled Supply and Virtual Demand Awards.~~where t~~ The IFM MCC amount for all scheduled Demand and Virtual Demand Awards is the sum of the products of the IFM MCC and the total of the MWh of Demand scheduled in the Day-Ahead Schedule and Virtual Demand Awards at all the applicable PNodes, Scheduling Points and Aggregated Pricing Nodes for the Settlement Period. ~~and t~~ The IFM MCC amount for all scheduled Supply and Virtual Demand Awards is the sum of the products of the IFM MCC and the total of the MWh of Supply scheduled in the Day-Ahead Schedule and the Virtual Supply Awards at all the applicable PNodes and Scheduling Points for the Settlement Period.

* * *

11.2.4.5 CRR Balancing Account~~.~~

The CRR Balancing Account shall accumulate: (1) the seasonal and monthly CRR Auction revenue amounts that were converted into daily CRRBA values as described in Section 11.2.4.3, ~~and~~ (2) any surplus revenue or shortfall generated from hourly CRR Settlements as described in Section 11.2.4.4, and (3) any adjustments of CRR revenue due to virtual bidding or Intertie scheduling practices as described in Section 11.2.4.6. Interest accruing due to the CRR Balancing Account shall be at the CAISO's received interest rate and shall be credited to each monthly CRRBA Accrued Interest Fund,

which is then allocated to monthly Measured Demand excluding Measured Demand associated with valid and balanced ETC, TOR, or CVR self-schedule quantities for which IFM Congestion Credits and/or RTM Congestion Credits were provided in the same month.

* * *

11.2.4.6 Adjustment of CRR Revenue

The CAISO will adjust the revenue from the CRRs of a CRR Holder that is also a Convergence Bidding Entity, and will adjust the revenue from the CRRs of a CRR Holder (regardless of whether the CRR Holder is also a Convergence Bidding Entity) where the Scheduling Coordinator representing that CRR Holder has reduced a Day-Ahead import or export Schedule in the HASP as set forth in Section 11.32, whenever the virtual bidding activity on behalf of that entity or a reduction to a Day-Ahead import or export Schedule in the HASP has had a significant impact on the value of the CRRs in the DAM as determined in accordance with the following steps.

(a) For purposes of this Section 11.2.4.6 and the definition of Flow Impact, any reduction by a Scheduling Coordinator submitting Schedules on behalf of an entity that is a CRR Holder to an import or export Schedule in the HASP will be treated as a Virtual Award. For each CRR Holder subject to this Section 11.2.4.6, for each hour, and for each Constraint binding in the IFM, HASP, or RTD, the CAISO will calculate the Flow Impact of the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder, excluding Virtual Awards at LAPs and generation Trading Hubs.

(b) The CAISO will determine the peak and off-peak hours of the day in which Congestion on the Constraint was significantly impacted by the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder. Congestion on the Constraint will be deemed to have been significantly impacted by the Virtual Awards awarded to the Scheduling Coordinator that represents the CRR Holder if the Flow Impact passes two criteria. First, the Flow Impact must be in the direction to increase the value of the CRR Holder's CRR portfolio. Second, the Flow Impact must exceed the configurable threshold percentage of

the flow limit for the Constraint. The threshold percentage will initially be set at ten (10) percent of the flow limit for each Constraint. The threshold percentage may be changed as provided in the Business Practice Manual. An increase in the threshold percentage for any Constraint must be based on evidence (from simulations of market re-runs or other appropriate analytical tool) that a Flow Impact greater than the current threshold percentage should not be expected to have a significant impact on the Constraint's Shadow Price. A decrease in the threshold percentage for any Constraint must be based on evidence (from simulations of market re-runs or other appropriate analytical tool) that a Flow Impact less than the current threshold percentage should not be expected to have a significant impact on the Constraint's Shadow Price. DMM will notify FERC of a change in any Constraint's threshold percentage in a quarterly report covering the date of the change in threshold percentage on a quarterly basis in the event of any change in threshold percentage during that quarter.

(c) For each peak or off-peak hour that passes both criteria in Section 11.2.4.6(b), the CAISO will compare the Constraint's impact on the Day-Ahead Market value of the CRR Holder's CRR portfolio with the Constraint's impact on the HASP or Real-Time Market value of the CRR Holder's CRR portfolio, as applicable.

(d) The CAISO will adjust the peak or off-peak period revenue from the CRR Holder's CRRs in the event that, over the peak or off-peak period of a day, the Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Constraint's contribution to the HASP or Real-Time Market value of the CRR Holder's CRR portfolio, as applicable. The amount of the peak period adjustment will be the amount by which the Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Constraint's contribution to the HASP or Real-Time Market value of the CRR Holder's CRR portfolio for the peak-period hours that passed both criteria in Section 11.2.4.6(b), as applicable. The amount of the off-peak period

adjustment will be the amount by which the Constraint's contribution to the Day-Ahead Market value of the CRR Holder's CRR portfolio exceeds the Constraint's contribution to the HASP or Real-Time Market value of the CRR Holder's CRR portfolio for the off-peak period hours that passed both criteria in Section 11.2.4.6(b), as applicable.

All adjustments of CRR revenue calculated pursuant to this Section 11.2.4.6 will be added to the CRR Balancing Account.

* * *

11.3 ~~[NOT USED]~~Settlement of Virtual Awards

11.3.1 Virtual Supply Awards

The CAISO will pay each Scheduling Coordinator with Virtual Supply Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the Day-Ahead LMP at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Supply Awards. Virtual Supply Awards subject to price correction will be settled as specified in Section 11.21. The CAISO will charge each Scheduling Coordinator with Virtual Supply Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the simple hourly average of the Dispatch Interval Real-Time LMPs at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Supply Awards. The CAISO will charge each Scheduling Coordinator with Virtual Supply Awards at an Intertie an amount equal to the simple hourly average of the fifteen (15) minute HASP Intertie LMPs multiplied by the MWhs of Virtual Supply Awards.

11.3.2 Virtual Demand Awards

The CAISO will charge each Scheduling Coordinator with Virtual Demand Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the Day-Ahead Market LMP at the Eligible PNode or Eligible Aggregated PNode multiplied by the MWhs of Virtual Demand Awards. Virtual Demand Awards subject to price correction will be settled as specified in Section 11.21. The CAISO will pay each Scheduling Coordinator with Virtual Demand Awards at an Eligible PNode or Eligible Aggregated PNode an amount equal to the simple hourly average of the Dispatch Interval Real-Time LMPs at the Eligible PNode or Eligible Aggregated PNode multiplied by the IFM MWhs of Virtual Demand Awards. The

CAISO will pay each Scheduling Coordinator with Virtual Demand Awards at an Intertie an amount equal to the simple hourly average of the fifteen (15) minute HASP Intertie LMPs multiplied by the Day-Ahead MWhs of Virtual Demand Awards.

* * *

11.5.4.2 Allocations of Non-Zero Amounts of the Sum of IIE, UIE, UFE, ~~and~~ the Real-Time Ancillary Services Congestion Revenues and Real-Time Virtual Awards Settlements~~.~~

The CAISO will first compute (1) the Real-Time Congestion Offset and allocate it to all Scheduling Coordinators, based on Measured Demand, excluding Demand associated with ETC or TOR Self-Schedules for which a HASP and RTM Congestion Credit was provided as specified in Section 11.5.7, and excluding Demand associated with ETC, Converted Right, or TOR Self-Schedules for which an IFM Congestion Credit was provided as specified in Section 11.2.1.5; and (2) the Real-Time Marginal Cost of Losses Offset and allocate it to all Scheduling Coordinators based on Measured Demand, excluding Demand associated with TOR Self-Schedules for which a RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules was provided as specified in Section 11.5.7.2, and excluding Demand associated with TOR Self-Schedules for which an IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules was provided as specified in Section 11.2.1.7. For Scheduling Coordinators for MSS operators that have elected to Load follow or net settlement, or both, the Real-Time Marginal Cost of Losses Offset will be allocated based on their MSS Aggregation Net Measured Demand excluding Demand associated with TOR Self-Schedules for which a RTM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules was provided as specified in Section 11.5.7.2, and excluding Demand associated with TOR Self-Schedules for which an IFM Marginal Cost of Losses Credit for Eligible TOR Self-Schedules was provided as specified in Section 11.2.1.7. For Scheduling Coordinators for MSS Operators regardless of whether the MSS Operator has elected gross or net Settlement, the CAISO will allocate the Real-Time Congestion Offset based on the MSS Aggregation Net Non-ETC/TOR Measured Demand. To the extent that the sum of the Settlement amounts for IIE, UIE, UFE, ~~and~~ the Real-Time Ancillary Services Congestion revenues and Virtual Awards settlements in the HASP and Real-Time Market in accordance with Section 11.3, less Real-Time Congestion Offset, and less the Real-Time Marginal Cost of Losses Offset, does not equal zero, the CAISO will assess charges or make payments

for the resulting differences to all Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that are not Load following MSSs and have elected gross Settlement, based on a pro rata share of their Measured Demand for the relevant Settlement Interval. For Scheduling Coordinators for MSS Operators that have elected net Settlement, the CAISO will assess charges or make payments for the resulting non-zero differences of the sum of the Settlement amounts for IIE, UIE, and UFE, ~~and~~ the Real-Time Ancillary Services Congestion Revenues and Virtual Awards settlements in the HASP and Real-Time Market in accordance with Section 11.3, less Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset, based on their MSS Aggregation Net Measured Demand. For Scheduling Coordinators for MSS Operators that have elected Load following, the CAISO will not assess any charges or make payments for the resulting non-zero differences of the sum of the Settlement amounts for IIE, UIE, and UFE, ~~and~~ the Real-Time Ancillary Services Congestion Revenues and Virtual Awards settlements in the HASP and Real-Time Market in accordance with Section 11.3, less Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset.

* * *

11.8 Bid Cost Recovery~~.~~

For purposes of determining the Unrecovered Bid Cost Uplift Payments for each Bid Cost Recovery Eligible Resource as determined in Section 11.8.5 and the allocation of Unrecovered Bid Cost Uplift Payments for each Settlement Interval, the CAISO shall sequentially calculate the Bid Costs, which can be positive (IFM, RUC or RTM Bid Cost Shortfall) or negative (IFM, RUC or RTM Bid Cost Surplus) in the IFM, RUC and the Real-Time Market, as the algebraic difference between the respective IFM, RUC or RTM Bid Cost and the IFM, RUC or RTM Market Revenues, which is netted across the CAISO Markets. In any Settlement Interval a resource is eligible for Bid Cost Recovery payments only if it is On, or in the case of a Participating Load, only if the resource has actually stopped or started consuming pursuant to the Dispatch Instruction. BCR Eligible Resources for different MSS Operators are supply resources listed in the applicable MSS Agreement. All Bid Costs shall be based on mitigated Bids as specified in Section 39.7. Virtual Awards are not eligible for Bid Cost Recovery. Virtual Awards are eligible for make-whole payments due to price corrections pursuant to Section 11. 21.2. In order to be eligible for Bid Cost Recovery, Non-Dynamic Resource-Specific System Resources must provide to the CAISO SCADA data

by telemetry to the CAISO's EMS in accordance with Section 4.12.3 demonstrating that they have performed in accordance with their CAISO commitments.

* * *

11.8.3 RUC Bid Cost Recovery Amount.

For purposes of determining the RUC Unrecovered Bid Cost Uplift Payments as determined in Section 11.8.5 and for the purposes of allocating Net RUC Bid Cost Uplift as described in Section 11.8.6.5, the CAISO shall calculate the RUC Bid Cost Shortfall or the RUC Bid Cost Surplus as the algebraic difference between the RUC Bid Cost and the RUC Market Revenues for each Bid Cost Recovery Eligible Resource for each Settlement Interval. The RUC Bid Costs shall be calculated pursuant to Section 11.8.3.1 and the RUC Market Revenues shall be calculated pursuant to Section 11.8.3.2. Bid Cost Recovery costs related to Short Start Units committed in Real-Time as a result of awarded RUC Capacity will be included in RUC Compensation Costs.

* * *

11.8.6.3 Determination of Total Positive CAISO Markets Uplifts.

Any negative IFM, RUC or Real-Time Market Bid Cost Uplifts are set to $0 and any positive Net IFM Bid Cost Uplifts, RUC Bid Cost Uplifts, or Real-Time Market Bid Cost Uplifts are further reduced by the uplift ratio in Section 11.8.6.3(iii) to determine the Total CAISO Markets Uplift as follows;

(i) The Total CAISO Markets Uplift is determined as the sum of the Net IFM Bid Cost Uplift, the Net RUC Bid Cost Uplift, and the Net Real-Time Market Bid Cost Uplift, for all Settlement Intervals in the IFM, RUC and Real-Time Market.

(ii) The Total Positive CAISO Market Uplift, is determined as the sum of the positive IFM Bid Cost Uplift, positive RUC Bid Cost Uplift and positive Real-Time Market Bid Cost Uplift, for all Settlement Intervals in the IFM, RUC and Real-Time Market.

(iii) The uplift ratio is equal to the Total CAISO Markets Uplift divided by the Total Positive CAISO Market Uplift.

11.8.6.4 Allocation of Net IFM Bid Cost Uplift.

For each Trading Hour of the IFM, the hourly Net IFM Bid Cost Uplift is determined as the sum over the Settlement Intervals in that Trading Hour of the product of any positive Net IFM Bid Cost Uplift remaining in the Settlement Interval after the sequential netting in Section 11.8.6.2 and the application of the uplift ratio as determined in 11.8.6.3. ~~The hourly Net IFM Bid Cost Uplift is allocated in two tiers as follows:~~

11.8.6.4.1 Allocation in the First Tier

The hourly Net IFM Bid Cost Uplift is allocated in the first tier as follows:

(i) ~~In the first tier, t~~The hourly amount of Net IFM Bid Cost Uplift ~~is~~ allocated to each Scheduling Coordinator~~s~~ is equal to the product of the IFM Bid Cost Uplift rate and the IFM uplift obligation for the Scheduling Coordinator.

(ii) The IFM Bid Cost Uplift rate is equal to the Net IFM Bid Cost Uplift divided by the sum of~~in proportion to~~ the~~ir non-negative~~ positive IFM Load Uplift Obligations for all Scheduling Coordinators and the IFM system-wide Virtual Demand Award uplift obligation, ~~but with an~~subject to the condition that the IFM Bid Cost Uplift rate ~~which is~~ cannot ~~to~~ exceed the ratio of the hourly Net IFM Bid Cost Uplift for the Trading Hour divided by the maximum of (~~1~~a) the sum of all hourly IFM Load Uplift Obligations for all Scheduling Coordinators in that Trading Hour or (~~2~~b) the sum of all hourly Generation scheduled in the Day-Ahead Schedule and IFM upward AS Awards for all Scheduling Coordinators from CAISO-committed Bid Cost Recovery Eligible Resources in that Trading Hour.

(iii) The IFM uplift obligation for each Scheduling Coordinator is equal to the sum of the IFM Load Uplift Obligation for the Scheduling Coordinator and any IFM Virtual Demand Award uplift obligation for the Scheduling Coordinator.

(iv) The IFM Load Uplift Obligation for each Scheduling Coordinator, including Scheduling Coordinators for Metered Subsystems regardless of their MSS optional elections (net/gross Settlement, Load following, RUC opt-in/out), is equal to the positive difference between the total Demand scheduled in the Day-Ahead Schedule of that Scheduling Coordinator and the sum of scheduled Generation

and scheduled imports from the Self-Schedules in the Day-Ahead Schedule of that Scheduling Coordinator, adjusted by any applicable Inter-SC Trades of IFM Load Uplift Obligations.

(v) The IFM system-wide Virtual Demand Award uplift obligation is calculated for each hour in the IFM and is equal to maximum of zero (0) or the following quantity: the total system-wide Virtual Demand Awards from the IFM minus the total system-wide Virtual Supply Awards from the IFM, plus the minimum of zero (0) or the following quantity: the total amount of Scheduled Demand (which excludes Virtual Demand Awards), minus net Virtual Demand Awards minus Measured Demand.

(vi) For each Scheduling Coordinator with positive net Virtual Demand Awards, the IFM Virtual Demand Award uplift obligation is equal to the product of (a) the positive net Virtual Demand Awards for the Scheduling Coordinator divided by the sum of each Scheduling Coordinator's positive net Virtual Demand Award and (b) the IFM system-wide Virtual Demand Award uplift obligation. For each Scheduling Coordinator with negative net Virtual Demand Awards, the IFM Virtual Demand Award uplift obligation is zero (0).

11.8.6.4.2 Allocation in the Second Tier

~~(ii)~~ In the second tier, Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that have elected both to not follow their Load and gross Settlement, will be charged for an amount equal to any remaining hourly Net IFM Bid Cost Uplift for the Trading Hour in proportion to the Scheduling Coordinator's Measured Demand. Scheduling Coordinators for MSS Operators that have elected to either follow their Load or net Settlement, or both, will be charged for an amount equal to any remaining hourly Net IFM Bid Cost Uplift for the Trading Hour in proportion to their MSS Aggregation Net Measured Demand.

* * *

11.8.6.5.2 Calculation of the Hourly Net RUC Bid Cost Uplift~~.~~

For each Trading Hour of the RUC, the hourly Net RUC Bid Cost Uplift is determined as the sum over the Settlement Intervals in that Trading Hour of the product of any positive Net RUC Bid Cost Uplift remaining in the Settlement Interval after the sequential netting in Section 11.8.6.2 and the application of the uplift ratio as determined in Section 11.8.6.3. Consistent with Section 31.5.2.2, Scheduling Coordinators for MSS Operators that have opted out of RUC participation, or opt-out of RUC by default as a result of having elected to Load follow, will not be subject to any RUC Bid Cost Uplift allocation. Scheduling Coordinators for MSS Operators that have opted-into RUC, and consequently also are non-Load following and under gross Settlement, will receive the allocation of hourly Net RUC Bid Cost Uplift like all other Scheduling Coordinators.

11.8.6.5.3 Allocation of the RUC Compensation Costs.

11.8.6.5.3.1 Allocation in the First Tier

Hourly RUC Compensation Costs are allocated in the first tier as follows:

(i) In the first tier, tThe amount of RUC Compensation Costs are allocated to each Scheduling Coordinators, is equal to the product of the RUC Bid Cost Uplift rate and the RUC obligation for the Scheduling Coordinator. Participating Load will not be subject to the first-tier allocation of RUC Compensation Costs to the extent that the Participating Load's Net Negative CAISO Demand Deviation in that Trading Hour is incurred pursuant to a CAISO directive to consume in a Dispatch Instruction.

(ii) The RUC Bid Cost Uplift based on their Net Negative CAISO Demand Deviation in that Trading Hour. The Scheduling Coordinator shall be charged at a rate which is equal to the lower of (1a) the RUC Compensation Costs to meet Measured Demand divided by the sum of each Scheduling Coordinator's Net Negative CAISO Demand Deviation for all Scheduling Coordinators and any positive net system-wide Virtual Supply Awards in that Trading Hour,; or (2b) the RUC BidCompensation Costs Uplift divided by the RUC Capacity, for all Scheduling Coordinators in that Trading Hour. Participating Load shall not be

~~subject to the first tier allocation of RUC Compensation Costs to the extent that the Participating Load's Net Negative CAISO Demand Deviation in that Trading Hour is incurred pursuant to a CAISO directive to consume in a Dispatch Instruction.~~

(iii) The RUC obligation for each Scheduling Coordinator is equal to the sum of the Net Negative CAISO Demand Deviation for the Scheduling Coordinator in that Trading Hour and any RUC Bid Cost obligation for Virtual Supply Awards for the Scheduling Coordinator.

(iv) The RUC Compensation Costs to meet Measured Demand are equal to the RUC Bid Cost Uplift minus the excess load share, where the excess load share is equal to the product of (a) the RUC Bid Cost Uplift divided by total RUC Capacity and (b) the maximum of zero (0) or the excess of the CAISO Demand Forecast over Measured Demand.

(v) For each Scheduling Coordinator with positive net Virtual Supply Awards, the RUC Bid Cost obligation for Virtual Supply Awards is equal to the product of (a) the positive net Virtual Supply Awards for the Scheduling Coordinator divided by the sum of each Scheduling Coordinator's positive net Virtual Supply Awards and (b) any positive net system-wide Virtual Supply Awards. For each Scheduling Coordinator with non-positive net Virtual Supply Awards, the RUC Bid Cost obligation for Virtual Supply Awards is zero (0).

11.8.6.5.3.2 Allocation in the Second Tier

~~(ii)~~ In the second tier, the Scheduling Coordinator shall be charged an amount equal to any remaining RUC Compensation Costs in proportion to the Scheduling Coordinator's metered CAISO Demand in any Trading Hour, including any RUC Compensation Costs that were not recovered in the first tier pursuant to Section 11.8.6.5.3.1.

11.8.6.6 Allocation of Net RTM Bid Cost Uplift~~.~~

The hourly Net RTM Bid Cost Uplift is computed for the Trading Hour as the product of the uplift ratio in Section 11.8.6.3 and the sum over all Settlement Intervals of the Trading Hour of any positive Net RTM Bid Cost Uplift after the sequential netting in Section 11.8.6.2. The hourly RTM Bid Cost Uplift is allocated to Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that have elected (a) not to follow their Load, and (b) gross Settlement, in proportion to their Measured Demand for the Trading Hour. For Scheduling Coordinators for MSS Operators that have elected (a) not to follow their Load, and (b) net Settlement, the hourly RTM Bid Cost Uplift is allocated in proportion to their MSS Aggregation Net Measured Demand. For Scheduling Coordinators of MSS Operators that have elected to follow their Load, the RTM Bid Cost Uplift shall be allocated in proportion to their MSS Net Negative Uninstructed Deviation plus any HASP reductions not associated with ETCs, TORs or Converted Rights. Accordingly, each Scheduling Coordinator shall be charged an amount equal to its Measured Demand times the RTM Bid Cost Uplift rate, where the RTM Bid Cost Uplift rate is computed as the Net RTM Bid Cost Uplift amount divided by the sum of Measured Demand across all Scheduling Coordinators for the Trading Hour.

* * *

11.21.2 ~~[Not Used]~~ Price Correction for Settlement of Virtual Awards

If the CAISO corrects an LMP pursuant to Section 35 that affects a Virtual Award such that either a portion or the entirety of the Virtual Bid Curve associated with the Virtual Award becomes uneconomic, then the CAISO will calculate and apply the price correction for settlement of Virtual Awards as follows: the total cleared MWhs of Virtual Awards multiplied by the corrected LMP, plus the make-whole amount. The make-whole amount for Virtual Demand Awards will be calculated on an hourly basis determined by the area between the Virtual Bid Curve and the corrected LMP, which is calculated as the MWhs in each of the cleared Virtual Bid segments of the Virtual Demand Bid multiplied by the maximum of zero or the corrected LMP minus the Virtual Bid segment price. For Virtual Supply Awards, the make-whole amount will be calculated on an hourly basis determined by the area between the Virtual Bid Curve and the corrected LMP, which is calculated as the MWhs in each of the cleared Virtual Bid segments of the Virtual Supply Bid multiplied by the maximum of zero or the Virtual Bid segment price minus the corrected LMP.

* * *

11.22.2.5 Allocation of the GMCrid Management Charge Among Scheduling Coordinators.

The costs recovered through the Grid Management Charge shall be allocated to the service charges that comprise the Grid Management Charge. If the CAISO's revenue requirement for any service charge changes from the most recent FERC-approved revenue requirement for that service charge, the costs recovered through that service charge shall be delineated in a filing to be made at FERC as set forth in Section 11.22.2.6. The service charges, as described in more detail in Appendix F, Schedule 1, Parts A and F, are as follows:

(1a) Core Reliability Services – Demand Charge;

(2b) Core Reliability Services – Energy Exports Charge;

(3c) Energy Transmission Services – Net Energy Charge;

(4d) Energy Transmission Services – Uninstructed Deviations Charge;

(5e) Core Reliability Services/Energy Transmission Services – Transmission Ownership Rights Charge;

(6f) Forward Scheduling Charge;

(7g) Market Usage Charge; and

(8h) Settlements, Metering, and Client Relations Charge; and.

(i) Virtual Award Charge.

The charges shall be levied separately monthly in arrears on all Scheduling Coordinators based on the billing determinants specified below for each charge in accordance with formulae set out in Appendix F, Schedule 1, Part A, subject to the requirements set out in Appendix F, Schedule 1, Part F.

* * *

11.22.2.5.9 Virtual Award Charge

The Virtual Award Charge for each Scheduling Coordinator will be calculated according to the formula in Appendix F, Schedule 1, Part A, subject to the requirements set out in Appendix F, Schedule 1, Parts A, C and E.

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11.22.4 Virtual Bid Submission Charge

Each Scheduling Coordinator submitting a Virtual Bid will be subject to a Virtual Bid Submission Charge of $0.005 for each Virtual Bid segment that is passed to the IFM.

* * *

~~**11.24 Interim Scheduling Report, Charge and Allocation.**~~

~~**11.24.1 Interim Scheduling Report.**~~

~~The CAISO will provide to each Scheduling Coordinator on a weekly basis a report of the difference between a Scheduling Coordinator's metered CAISO Demand and the total CAISO Demand scheduled by the Scheduling Coordinator in its Day-Ahead Schedule, based on available Meter Data. The CAISO shall treat such reports as confidential in accordance with Section 20. Such reports shall be prepared as provided in the applicable Business Practice Manual.~~

~~**11.24.2 Interim Scheduling Charge.**~~

~~The monthly Interim Scheduling Charge will be calculated and charged to Scheduling Coordinators based on each Scheduling Coordinator's Net Negative CAISO Demand Deviation in each applicable LAP minus the CAISO Curtailed IFM Quantity. The monthly Interim Scheduling Charge will be calculated and charged as follows:~~

~~(a) For any given Trading Hour in which the Scheduling Coordinator's Net Negative CAISO Demand Deviation in its applicable LAP minus the CAISO Curtailed IFM Quantity is greater than fifteen percent (15%) and less than twenty percent (20%) of the maximum of the Scheduling Coordinator's cleared total CAISO Demand as represented in its Day-Ahead Schedule in its applicable LAP or its submitted Self-Schedule for that LAP, the Scheduling Coordinator shall pay $150/MWh for its Net Negative CAISO Demand Deviation minus the CAISO Curtailed IFM Quantity minus fifteen percent (15%) of the maximum of the Scheduling Coordinator's cleared total CAISO Demand as represented in its Day-Ahead Schedule or its submitted Self-Schedule for that LAP.~~

(b) For any given Trading Hour in which the Scheduling Coordinator's Net Negative CAISO Demand Deviation in its applicable LAP minus the CAISO Curtailed IFM Quantity is greater than or equal to twenty percent (20%) of the maximum of the Scheduling Coordinator's cleared total CAISO Demand as represented in its Day-Ahead Schedule in its applicable LAP or its submitted Self-Schedule for that LAP, the Scheduling Coordinator shall pay $250/MWh for its Net Negative CAISO Demand Deviation minus the CAISO Curtailed IFM Quantity minus twenty percent (20%) of the maximum of the Scheduling Coordinator's cleared total CAISO Demand as represented in its Day-Ahead Schedule or its submitted Self-Schedule for that LAP, plus $150/MWh for five percent (5%) of the maximum of its cleared total CAISO Demand as represented in its Day-Ahead Schedule or its submitted Self-Schedule for that LAP.

11.24.3 Exemptions from the Interim Scheduling Charge.

The Interim Scheduling Charge shall not apply to the following circumstances:

(a) For any given Trading Day for Scheduling Coordinators in each applicable LAP in which the CAISO's daily Day-Ahead peak CAISO Forecast of CAISO Demand is ninety-five percent (95%) or less than daily actual metered CAISO Demand in the respective northern and southern regions of the CAISO Balancing Authority Area as further described in the Business Practice Manuals.

(b) For any given Trading Hour when a Scheduling Coordinator's metered CAISO Demand is less than or equal to 500 MW in a particular LAP, that Scheduling Coordinator shall not be subject to the Interim Scheduling Charge.

(c) For metered CAISO Demand by Participating Loads.

(d) For metered CAISO Demand that is MSS Load following Demand.

(e) For any given Trading Hour when the Hourly Real-Time LAP Price is less than the Day-Ahead LAP Price for the same Trading Hour in the applicable LAP.

(f) For metered CAISO Demand of Station Power Loads.

~~**11.24.4 Allocation of Revenue Collected Under the Interim Scheduling Charge.**~~

~~Any revenues collected with the assessment of the Interim Scheduling Charge shall be treated as "Other Revenues" as described in Part C of Schedule 1 of Appendix F. The Interim Scheduling Charge revenues will be used to offset the revenue requirement associated with the Market Usage Charge.~~

* * *

11.32 Measures to Address Intertie Scheduling Practices

The CAISO will take the following actions regarding Schedules that clear the Day-Ahead Market at the Interties and that a Scheduling Coordinator wholly or partially reverses in the HASP:

(i) The CAISO will charge the Scheduling Coordinator the positive difference between the Day-Ahead Market price and the HASP price applicable to any imports that clear the Day-Ahead Market and are reduced in the HASP for which the Scheduling Coordinator has failed to submit an E-Tag or E-Tags consistent with the Scheduling Coordinator's Day-Ahead Schedule and WECC scheduling criteria.

(ii) The CAISO will treat any reduction by a Scheduling Coordinator to a Day-Ahead import or export Schedule in the HASP as a Virtual Award for purposes of adjusting CRR Revenue pursuant to Section 11.2.4.6 if the Scheduling Coordinator submits Schedules on behalf of or is a CRR Holder.

(iii) For any import Schedule that clears the Day-Ahead Market which a Scheduling Coordinator reduces in the HASP, such reduced quantities will be subject to the allocation of Net RTM Bid Cost Uplift as set forth in Section 11.8.6.6.

(iv) The provisions of this Section 11.32 will not apply to Schedules that clear the Day-Ahead Market at the Interties and that a Scheduling Coordinator wholly or partially reverses in the HASP to the extent such Schedules are balanced ETC Self-Schedules, balanced TOR Self-Schedules, or balanced Converted Rights Self-Schedules.

12.1.1.2 ~~Qualitative and Quantitative~~ Credit Strength Indicators~~.~~

In determining a Market Participant's Unsecured Credit Limit, the CAISO may rely on information gathered from financial reporting agencies, the general/financial/energy press, and provided by the Market Participant to assess its overall financial health and its ability to meet its financial obligations. Information considered by the CAISO in this process may include the following qualitative factors:

(a) Applicant's history;

(b) Nature of organization and operating environment;

(c) Management;

(d) Contractual obligations;

(e) Governance policies;

(f) Financial and accounting policies;

(g) Risk management and credit policies;

(h) Market risk including price exposures, credit exposures and operational exposures;

(i) Event risk;

(j) The state or local regulatory environment; and

(k) Affiliate disclosure information provided pursuant to this CAISO Tariff, including Sections 4.14.2.1, 12.1.1, ~~and/or Section~~ 39.9, and/or 39.11.1.

Material negative information in these areas may result in a reduction of up to one hundred percent (100%) in the Unsecured Credit Limit that would otherwise be granted based on the six-step process described in Section 12.1.1.1. A Market Participant, upon request, will be provided a written analysis as to how the provisions in Section 12.1.1.1 and this section were applied in setting its Unsecured Credit Limit.

* * *

12.1.3.1.1 Calculation of the EAL~~stimated Aggregate Liability~~ Amount~~.~~

Except as described in Section 12.1.3.1.2, the CAISO shall use the method described in this Section 12.1.3.1.1 to calculate each Market Participant's Estimated Aggregate Liability (EAL). The Estimated

Aggregate Liability represents the amount owed to the CAISO for all unpaid obligations, specifically, the obligations for the number of Trading Days outstanding at a given time based on the CAISO's Payments Calendar plus five (7) Trading Days based on the allowable period for Market Participants to respond to CAISO requests for additional Financial Security collateral (three (3) Business Days), and other liabilities including the value of a Market Participant's CRR portfolio, if negative. The charges the CAISO shall use to calculate Estimated Aggregate Liability shall be charges described or referenced in the CAISO Tariff. The CAISO shall calculate the Estimated Aggregate Liability for each Market Participant by aggregating the following obligations:

- (a) invoiced amounts, i.e., any published but unpaid amounts on Invoices;
- (b) published amounts, i.e., amounts for Trading Days for which Settlement Statements have been issued;
- (c) estimated amounts, i.e., amounts based on estimated Settlement amounts calculated by the Settlement system using estimated meter data, and other available operational data;
- (d) extrapolated amounts, i.e., amounts calculated for Trading Days for which neither actual nor estimated Settlement Statements have been issued;
- (e) CRR portfolio value, i.e., the prospective value of the CRR portfolio, if negative, as described in Section 12.6.3;
- (f) CRR Auction limit, i.e., the maximum credit limit for participation in a CRR Auction;
- (g) CRR Auction awards (prior to invoicing), i.e., amounts to cover winning offers at the completion of the CRR Auction bur prior to invoicing;
- (h) Estimated Aggregate Liability adjustments resulting from Virtual Bid Submission Charges and the submission of Virtual Bids and/or receipt of Virtual Awards pursuant to Section 12.8;
- (i) past-due amounts, i.e., any unpaid or past due amounts on Invoices;

(j) FERC Annual FERC Charges, i.e., FERC Annual Charges for a Market Participant that has elected to pay such amounts on an annual basis that are owed and outstanding and not already captured in any other component of Estimated Aggregate Liability;

(k) WAC Charges, i.e., WAC amounts for the current year or future years as specified in Section 36.9.2;

(l) Estimated Aggregate Liability adjustments, i.e., adjustments that may be necessary as a result of analysis performed as a result of Section 12.4.2; and

(m) extraordinary adjustments, i.e., adjustments to Settlement amounts related to FERC proceedings, if known and estimated by the CAISO, as described in Section 12.1.3.1.3.

For a Market Participant that maintains multiple BAID numbers, the Estimated Aggregate Liability of the Market Participant as a legal entity shall be calculated by summing the Estimated Aggregate Liabilities for all such BAID numbers and comparing the sum of the Estimated Aggregate Liabilities to the Aggregate Credit Limit of the Market Participant. Market Participants may recommend changes to the liability estimates produced by the CAISO's Estimated Aggregate Liability calculation through the dispute procedures described in Section 12.4.2.

* * *

12.8 Credit Requirements Applicable to Virtual Bids

12.8.1 Credit Check in the Day-Ahead Market

12.8.1.1 Credit Check Requirements

For each Scheduling Coordinator that submits one or more Virtual Bids in the Day-Ahead Market, the CAISO will estimate the total value of all of the submitted Virtual Bids after the Virtual Bids have been validated in accordance with Section 30.7.3. In all circumstances except where the Scheduling Coordinator submits both a Virtual Supply Bid and a Virtual Demand Bid at the same Eligible PNode or Eligible Aggregated PNode for the same Trading Hour, the CAISO will estimate the total value of the submitted Virtual Bids at each Eligible PNode or Eligible Aggregated PNode for each Trading Hour by

calculating the sum of the products of the absolute values of the MWs of the submitted Virtual Bids multiplied by the applicable Virtual Bid Reference Price at the Eligible PNode or Eligible Aggregated PNode for all Trading Hours. In circumstances where the Scheduling Coordinator submits both a Virtual Supply Bid and a Virtual Demand Bid at the same Eligible PNode or Eligible Aggregated PNode for the same Trading Hour, the CAISO will estimate the total value of the submitted Virtual Bids at the Eligible PNode or Eligible Aggregated PNode for the Trading Hour by calculating the greater of (i) the product of the absolute value of the MW of the submitted Virtual Supply Bid multiplied by the Virtual Bid Reference Price for Virtual Supply Bids at the Eligible PNode or Eligible Aggregated PNode or (ii) the product of the absolute value of the MW of the submitted Virtual Demand Bid multiplied by the Virtual Bid Reference Price for Virtual Demand Bids at the Eligible PNode or Eligible Aggregated PNode. The CAISO will then adjust the Scheduling Coordinator's Estimated Aggregate Liability to include the CAISO's estimate of the total value of the submitted Virtual Bids. If the adjusted Estimated Aggregate Liability is greater than the Scheduling Coordinator's Aggregate Credit Limit, the CAISO will reject the Scheduling Coordinator's submitted Virtual Bids. After rejection of its submitted Virtual Bids, a Scheduling Coordinator may submit revised Virtual Bids, subject to the timelines set forth in the CAISO Tariff and the applicable Business Practice Manual regarding the submission of Bids.

12.8.1.2 Temporary Suspension of Virtual Bidding

In the event that the financial exposure of Scheduling Coordinators cannot be determined pursuant to Section 12.8.1.1 with a reasonable degree of accuracy due to factors such as software or system failures, the CAISO may temporarily suspend virtual bidding. If the CAISO temporarily suspends virtual bidding pursuant to this Section 12.8.1.2, as soon as reasonably practicable, the CAISO will notify FERC and Market Participants of the reason(s) for any suspension of virtual bidding, the action(s) necessary to restore virtual bidding, and the estimated time required to restore virtual bidding. The CAISO does not intend to suspend virtual bidding in the event of brief intermittent software or system failures or where the CAISO anticipates the credit checking functionality will be available prior to the close of the Day-Ahead Market. During instances of software or system failures that extend past the close of the Day-Ahead Market and in the absence of any suspension of virtual bidding, the CAISO will accept pending Virtual Bids at the close of the Day-Ahead Market even though the Virtual Bids have not been validated by the

credit checking functionality. Any resulting financial obligations will be included in the next available calculation of each Scheduling Coordinator's Estimated Aggregate Liability.

12.8.2 Virtual Bid Reference Prices

For Virtual Supply Bids, the Virtual Bid Reference Price will be the 95th percentile value of the difference between the LMP in the Real-Time Market (or in the HASP for Virtual Supply Bids at the Interties) and the LMP in the Day-Ahead Market at a given Eligible PNode or Eligible Aggregated PNode. For Virtual Demand Bids, the Virtual Bid Reference Price will be the 95th percentile value of the difference between the LMP in the Day-Ahead Market and the LMP in the Real-Time Market (or in the HASP for Virtual Supply Bids at the Interties) at a given Eligible PNode or Eligible Aggregated PNode. Each Virtual Bid Reference Price will be calculated in $/MWh. The CAISO will calculate the Virtual Bid Reference Price for each Eligible PNode or Eligible Aggregated PNode for three-month periods (covering January-March, April-June, July-September, and October-December) of each year using the hourly actual LMPs for the same period of the previous year.

12.8.3 Adjustment of EAL After Close of the DAM

After the Day-Ahead Market closes but before the Real-Time Market closes, the CAISO will recalculate the estimate of the total liability of the Virtual Bids of each Scheduling Coordinator based on the MW quantity that cleared in the Day-Ahead Market. The revised total estimated liability will equal the sum of the products of the absolute values of the amounts of MWs of Virtual Awards multiplied by the Virtual Bid Reference Price. The CAISO will then adjust the Estimated Aggregate Liability of the Scheduling Coordinator to reflect the revised total estimated liability of the Virtual Bids as calculated by the CAISO.

12.8.4 Adjustment of EAL After the Close of the RTM

After the Real-Time Market closes, the CAISO will recalculate the total liability of each Scheduling Coordinator with Virtual Awards based on the MW quantity that cleared in the Day-Ahead Market and the LMPs produced in the Day-Ahead Market, HASP, and Real-Time Market. The total liability of a Scheduling Coordinator will equal the sum of the liability of each Virtual Bid submitted by the Scheduling Coordinator that cleared in the Day-Ahead Market. The liability of a Virtual Supply Bid will equal the product of the value of the amount of cleared MWs multiplied by the difference between the Real-Time or HASP LMP, as appropriate, and the Day-Ahead LPM at the Eligible PNode or Eligible Aggregated PNode

at which the Virtual Supply Bid was submitted. The liability of a Virtual Demand Bid will equal the product of the value of the amount of cleared MWs multiplied by the difference between the Day-Ahead LPM and the Real-Time or HASP LMP, as appropriate, at the Eligible PNode or Eligible Aggregated PNode at which the Virtual Demand Bid was submitted. The Estimated Aggregate Liability will be adjusted accordingly and will continue to be adjusted as a result of any price correction made in accordance with Section 35.

* * *

30.2 Bid Types.

There are three types of Bids: Energy Bids (which include Virtual Bids), Ancillary Services Bids, and RUC Availability Bids. Each Bid type can be submitted as either an Economic Bid or a Self-Schedule (except for RUC Availability Bids and Virtual Bids, which cannot be self-scheduled). Economic Bids specify prices for MW amounts of capacity or MWh amounts of Energy. Self-Schedules do not have any prices associated for MW or MWh. Energy Bids, including both Economic Bids and Self-Schedules, may be either Supply Bids, ~~or~~ Demand Bids, Virtual Supply Bids, or Virtual Demand Bids. Ancillary Services Bids and RUC Availability Bids are Supply Bids only. Ancillary Services may be self-provided by providing a Submission to Self-Provide an Ancillary Service and having that submission accepted by the CAISO. Rules for submitting the three types of Bids vary by the type of resource to which the Bid applies as described in Section 30.5 and as further required in each CAISO Markets process as specified in Sections 31, 33, and 34.

* * *

30.7.3.6 Additional Bid Validation Rules for Virtual Bids

In addition to the validation rules described in Section 30.7.3.1, Virtual Bids will be subject to the following additional validation rules.

30.7.3.6.1 Scheduling Coordinator Validation

The CAISO will validate that the SCID associated with a Virtual Bid is submitted from a Scheduling Coordinator authorized to submit Virtual Bids and that the Virtual Bid is submitted at an Eligible PNode or Eligible Aggregated PNode. The CAISO will reject Virtual Bids that do not satisfy these requirements.

30.7.3.6.2 Credit Requirement

Virtual Bids must satisfy the credit requirements of Section 12.8. The Scheduling Coordinator will be notified if Virtual Bids fail to satisfy the credit requirements. If the Scheduling Coordinator fails to resubmit Virtual Bids that satisfy the credit requirements or to provide adequate additional Financial Security, the CAISO will reject the Scheduling Coordinator's Virtual Bids on a last-in, first-out basis.

30.7.3.6.3 Position Limits

For each Convergence Bidding Entity, the CAISO will reject all Virtual Bids submitted by its Scheduling Coordinator at any Eligible PNode, Eligible Aggregated PNode (other than a Default LAP or Trading Hub), or Intertie that exceed the position limits specified in this Section 30.7.3.6.3. If the Scheduling Coordinator uses multiple SCIDs on behalf of a Convergence Bidding Entity, the position limits will apply to the sum of those Virtual Bids submitted at the Eligible PNode, Eligible Aggregated PNode (other than a Default LAP or Trading Hub), or Intertie. The CAISO will perform all position limit calculations based on the highest Virtual Bid segment MW point submitted in the Virtual Bid Curve. The CAISO will not net Virtual Supply Bids and Virtual Demand Bids in performing the position limit calculations. The affected Scheduling Coordinator will be provided notice that position limits have been violated. If the Scheduling Coordinator does not resubmit Virtual Bids within the position limits, the CAISO will reject Virtual Bids for all hours at each Eligible PNode, Eligible Aggregated PNode (other than a Default LAP or Trading Hub), and Intertie where the position limits are violated. Position limits only apply to Eligible PNodes, Eligible Aggregated PNodes (other than Default LAPs or Trading Hubs), and Interties.

30.7.3.6.3.1 Position Limits at Eligible PNodes and Eligible Aggregated PNodes

For an Eligible PNode associated with a single physical supply resource, the CAISO will publish a locational limit that will be equal to the PMax of the physical supply resource. For an Eligible PNode or Eligible Aggregated PNode (other than a Default LAP or Trading Hub) associated with more than one physical supply resource, the CAISO will publish a locational limit that will be equal to the sum of the PMaxes of the physical supply resources. For an Eligible PNode associated with a single physical demand resource, the CAISO will publish a locational limit that will be equal to the forecast of the maximum MW consumption of the physical demand resource. For an Eligible PNode or Eligible Aggregated PNode (other than a Default LAP or Trading Hub) associated with more than one physical

demand resource, the CAISO will publish a locational limit that will be equal to the forecast of the maximum MW consumption of the physical demand resources. The percentages used to calculate the position limits for each Convergence Bidding Entity at Eligible PNodes and Eligible Aggregated PNodes (other than Default LAPs or Trading Hubs) will be the following percentages of the published locational limits:

(a) Position limits of ten (10) percent will apply during the time period beginning as of the effective date of this tariff provision through the last day of the eighth month following the effective date of this tariff provision.

(b) Position limits of fifty (50) percent will apply during the time period beginning as of the first day of the ninth month following the effective date of this tariff provision through the last day of the twelfth month following the effective date of this tariff provision.

(c) Position limits will cease to apply beginning on the first day of the month as of the first anniversary of the effective date of this tariff provision.

The CAISO will enforce the position limits for Eligible PNodes and Eligible Aggregated PNodes (other than Default LAPs or Trading Hubs) at the time of Virtual Bid submission. It is possible for the enforcement of position limits on a later-submitted Virtual Bid to cause a previously approved Virtual Bid to be rejected, if both of those Virtual Bids are submitted by a Scheduling Coordinator on behalf of the same Convergence Bidding Entity at the same Eligible PNode or Eligible Aggregated PNode (other than a Default LAP or Trading Hub). The CAISO will timely publish the locational limits for Eligible PNodes and Eligible Aggregated PNodes (other than Default LAPs or Trading Hubs).

30.7.3.6.3.2 Position Limits at Interties

For an Intertie, the locational limits will be equal to a percentage of the Operating Transfer Capability of the Intertie. The percentages used to calculate the position limits of each Convergence Bidding Entity at Interties will be the following percentages of the published locational limits:

(a) Position limits of five (5) percent will apply during the time period beginning as of the effective date of this tariff provision through the last day of the eighth month following the effective date of this tariff provision.

(b) Position limits of twenty-five (25) percent will apply during the time period beginning as of the first day of the ninth month following the effective date of this tariff provision through the last day of the twelfth month following the effective date of this tariff provision.

(c) Position limits of fifty (50) percent will apply during the time period beginning on the first day of the month as of the first anniversary of the effective date of this tariff provision through the last day of the sixteenth month following the effective date of this tariff provision.

(d) Position limits will cease to apply beginning on the first day of the seventeenth month following the effective date of this tariff provision.

The CAISO will enforce the locational limits for Interties at Bid submission and at Market Close for Virtual Bids. The CAISO will utilize the 9:00 AM Operating Transfer Capability for Bids submitted after 9:00 AM until the close of the Day-Ahead Market for the next Trading Day.

* * *

30.8 Prohibition on Bidding Across Out-of-Service Transmission Paths at Scheduling Points.

Scheduling Coordinators shall not submit any Bids, including Virtual Bids or ETC Self-Schedules at Scheduling Points using a transmission path for any Settlement Period for which the 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 Operating Transfer Capability on the transmission path is zero (0) MW. If the 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.

30.9 Virtual Bids

Virtual Bids are Energy Bids that may be submitted only in the Day-Ahead Market, at Eligible PNodes or Eligible Aggregated PNodes, by Scheduling Coordinators representing Convergence Bidding Entities. Virtual Bids are either Virtual Supply Bids or Virtual Demand Bids. A Virtual Bid submitted in the Day-Ahead Market and cleared in the IFM represents a commitment to liquidate a Day-Ahead award in the Real-Time Market at the price determined for the applicable Eligible PNode or Eligible Aggregated PNode as set forth in Section 11.3. For each SCID associated with a Convergence Bidding Entity, there may be only one Virtual Supply Bid and one Virtual Demand Bid per each Eligible PNode or Eligible Aggregated PNode in the Day-Ahead Market. The minimum size of a segment of a Virtual Bid is one (1) MW.

30.9.1 Virtual Bid Components

Each Virtual Bid must have the following components: an indicator that identifies the Virtual Bid as a Virtual Supply Bid or a Virtual Demand Bid; Scheduling Coordinator ID Code; Eligible PNode or Eligible Aggregated PNode as applicable; Virtual Bid Curve; and the Trading Hour or Trading Day to which the Virtual Bid applies. Virtual Bids do not include Start-Up Costs or Minimum Load Costs.

30.10 Use of AC Solution and Nodal MW Constraints

The CAISO will achieve an alternating current (AC) solution in the Day-Ahead Market to the extent practicable. If and when it is impracticable to achieve an AC power flow solution without the initial enforcement of nodal MW limit constraints, the CAISO will apply nodal MW constraints to Eligible PNodes (except for Eligible PNodes established for Interties, which are addressed through the process described in Section 31.9). The CAISO will determine whether to apply such nodal MW constraints as follows:

(i) The CAISO will calculate a MW limit for each Eligible PNode other than an Eligible PNode established for an Intertie. For an Eligible PNode associated with physical supply resource, the MW limit will be equal to a factor multiplied by the PMax of the physical supply resource. For an Eligible PNode associated with a physical demand resource, the MW limit will be equal to a factor multiplied by the

nodal load forecast of the Eligible PNode calculated as the MW portion of the System Demand Forecast that is distributed to the Eligible PNode according to the corresponding system Load Distribution Factor associated with the Eligible PNode. The factors used in these calculations will be determined in accordance with a process set forth in the Business Practice Manuals.

(ii) For each of the Eligible PNodes or group of Eligible PNodes, the CAISO will calculate the percentage by which the sum of the MW amounts of all Energy Supply Bids, Demand Bids, and Virtual Bids exceeds the MW limit calculated pursuant to Section 30.10(i).

(iii) Starting with the Eligible PNodes or group of Eligible PNodes at which the MW limits would be exceeded by the largest percentages, and working in descending order of the Eligible PNodes or group of Eligible PNodes that would exceed their MW limits ranked by the extent to which the corresponding MW limits would be exceeded, the CAISO will apply the MW limits to all Energy Supply Bids, Demand Bids, and Virtual Bids at the applicable Eligible PNodes or group of Eligible PNodes and run iterations of the IFM until the CAISO Markets can achieve an AC solution. The application of the MW limit will be enforced by means of a MW limit constraint on the sum of the nodal Energy Supply Bids, Demand Bids, and Virtual Bids as well as the portions of the aggregate Energy Supply Bids, Demand Bids, and Virtual Bids that are applicable to the Eligible PNodes or group of Eligible PNodes. The MW limit constraints will be enforced in the IFM optimization engine to curtail the Bids at the Eligible PNodes or group of Eligible PNodes that have been identified as candidates for causing AC convergence issues. The IFM optimization engine will use the economic criteria based on Bid prices and effectiveness of Bids to mitigate the violation of the MW limit at the Eligible PNode or group of Eligible PNodes.

* * *

31.2 ~~Market Power Mitigation and Reliability Requirement Determination (~~MPM-RRD~~).~~

After the Market Close of the DAM, and after the CAISO has validated the Bids pursuant to Section 30.7, the CAISO will perform the MPM-RRD procedures in a series of processing runs that occur prior to the IFM Market Clearing run. The MPM process determines which Bids need to be mitigated in the IFM. The RRD process is the automated process for determining RMR Generation requirements for RMR Units. The MPM-RRD process optimizes resources using the same optimization used in the IFM, but instead of using Demand Bids as in the IFM the MPM-RRD process optimizes resources to meet one hundred percent of the CAISO Demand Forecast and Export Bids to the extent the Export Bids are selected in the MPM-RRD process, and meet one hundred percent of Ancillary Services requirements based on Supply Bids submitted to the DAM. Virtual Bids are excluded from the MPM-RRD process. The mitigated or unmitigated Bid identified in the MPM-RRD process for all resources that cleared in the MPM-RRD are then passed to the IFM. The CAISO performs the MPM-RRD for the DAM for the twenty-four (24) hours of the targeted Trading Day.

* * *

31.5.1.1 Capacity Eligible for RUC Participation~~.~~

RUC participation is voluntary for capacity that has not been designated as Resource Adequacy Capacity. Scheduling Coordinators may make such capacity available for participation in RUC by submitting a RUC Availability Bid, provided the Scheduling Coordinator has also submitted an Energy Bid (other than a Virtual Bid) for such capacity into the IFM. Virtual Bids are not eligible to participate in RUC. Capacity from Non-Dynamic System Resources that has not been designated Resource Adequacy Capacity is not eligible to participate in RUC. Capacity from resources including System Resources that has been designated as qualified Resource Adequacy Capacity must participate in RUC. RUC participation is required for Resource Adequacy Capacity to the extent that Resource Adequacy Capacity is not committed following the IFM. System Resources eligible to participate in RUC will be considered on an hourly basis; that is, RUC will not observe any multi-hour block constraints. RUC will observe the Energy Limits that may have been submitted in conjunction with Energy Bids to the IFM. RMR Unit capacity will be considered in RUC in accordance with Section 31.5.1.3. MSS resources may participate in RUC in accordance with Section 31.5.2.3. COG resources are accounted for in RUC, but may not

submit or be paid RUC Availability Payments. The ELS Resources committed through the ELC Process conducted two (2) days before the day the RUC process is conducted for the next Trading Day as described in Section 31.7 are binding.

31.5.1.2 RUC Availability Bids.

Scheduling Coordinators may only submit RUC Availability Bids for capacity (above the Minimum Load) for which they are also submitting an Energy Bid (other than a Virtual Bid) to participate in the IFM. The RUC Availability Bid for the Resource Adequacy Capacity submitted by a Scheduling Coordinator must be $0/MW per hour for the entire Resource Adequacy Capacity. If the Scheduling Coordinator fails to submit a $0/MW per hour for Resource Adequacy Capacity, the CAISO will insert the $0/MW per hour for the full amount of Resource Adequacy Capacity for a given resource. Scheduling Coordinators may submit non-zero RUC Availability Bids for the portion of a resource's capacity that is not Resource Adequacy Capacity.

* * *

31. 8 Constraints at Scheduling Points for Interties

Within the IFM optimization, the CAISO enforces two (2) constraints at each Intertie Scheduling Point so that Virtual Bids do not result in net interchange schedules violating scheduling limits unless the bidding prohibition set forth in Section 30.8 applies. The first constraint is that physical imports net of physical exports must be less than or equal to the scheduling limit at the Scheduling Point in the applicable direction. The second constraint is that physical and virtual imports net of physical and virtual exports must be less than or equal to the scheduling limit at the Scheduling Point in the applicable direction. Although both constraints are enforced in both scheduling and pricing runs, only the second constraint Shadow Price is incorporated into the pricing run LMPs.

* * *

34.1 Inputs to the Real-Time Market.

The RTM utilizes results produced by the DAM and HASP for each Trading Hour of the Trading Day, including the combined commitments contained in the Day-Ahead Schedules, Day Ahead AS Awards, RUC Awards, HASP Intertie Schedules, HASP Self-Schedules, HASP Intertie AS Awards and the MPM-

RRD that is run as part of the HASP to determine reliability needs and mitigated bids for each relevant Trading Hour. Virtual Bids and Virtual Awards are not used in the Real-Time Market. These results, plus the short-term Demand Forecast, Real-Time Energy Bids, Real-Time Ancillary Service Bids, updated FNM, State Estimator output, resource outage and de-rate information constitute the inputs to the RTM processes. Bids submitted in HASP for all Generating Units and Participating Load shall be used in the Real-Time Market.

* * *

37.3 Submit Feasible Energy Bids, RUC Capacity Bids, Ancillary Service Bids, and Submissions to Self-Provide an Ancillary Service.

37.3.1 Bidding Generally.

37.3.1.1 Expected Conduct.

Market Participants must submit Bids for Energy, RUC Capacity and Ancillary Services and Submissions to Self-Provide an Ancillary Service from resources that are reasonably expected to be available and capable of performing at the levels specified in the Bid, and to remain available and capable of so performing based on all information that is known to the Market Participant or should have been known to the Market Participant at the time of submission. HASP Intertie Schedules for import or export Energy are not subject to the foregoing requirement, but failure to deliver on such HASP Intertie Schedules can violate the anti-manipulation provisions in Section 37.7 and in any regulations issued by FERC. The requirements of this Section 37.3.1.1 do not apply to the submission of Virtual Bids.

* * *

39.11 Market Power Mitigation Applicable to Virtual Bidding

39.11.1 Affiliate Disclosure Requirements

Each Convergence Bidding Entity must satisfy the Affiliate disclosure requirements set forth in Section 4.14.2.1.

39.11.2 Suspension or Limitation of Virtual Bidding

39.11.2.1 Suspension or Limitation Generally

The CAISO and DMM will monitor virtual bidding activity for anomalous market behavior, gaming, or the exercise of market power. The CAISO may suspend or limit the ability of one or more Scheduling Coordinators to submit Virtual Bids on behalf of one or more Convergence Bidding Entities for any of the reasons set forth in Section 39.11.2.2. The CAISO has the authority to suspend or to limit the ability of one or more Scheduling Coordinators to submit Virtual Bids on behalf of one or more Convergence Bidding Entities regardless of whether the CAISO has evidence that the virtual bidding activities that led to the suspension of limitation were the result of actions purposely or knowingly taken by Scheduling Coordinators or Convergence Bidding Entities to cause the outcomes set forth in Section 39.11.2.2 (including but not limited to actions taken in order to increase CRR revenues received by one or more CRR Holders, regardless of whether such actions result in an adjustment of CRR revenue pursuant to Section 11.2.4.6). The CAISO may exercise its suspension or limitation authority pursuant to this Section 39.11.2 at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes. The CAISO may suspend or limit Virtual Bids that have already been submitted, Virtual Bids that will be submitted in the future, or both. The CAISO's authority to suspend or limit the ability of all Scheduling Coordinators to submit Virtual Bids at specific Eligible PNodes or Eligible Aggregated PNodes, or at all Eligible PNodes or Eligible Aggregated PNodes will be governed by the Market Disruption provisions of Section 7.7.15 of the CAISO Tariff and not this Section 39.11.

39.11.2.2 Reasons for Suspension or Limitation

(a) The CAISO may suspend or limit the ability of one or more Scheduling Coordinators to submit Virtual Bids if the CAISO determines that virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities detrimentally affect System Reliability or grid operations. Virtual bidding activities can detrimentally affect System Reliability or grid operations if such activities contribute to threatened or imminent reliability conditions, including but not limited to the following circumstances:

(i) Submitted Virtual Bids create a substantial risk that the CAISO will be unable to obtain sufficient Energy and Ancillary Services

to meet Real-Time Demand and Ancillary Service requirements in the CAISO Balancing Authority Area.

(ii) Submitted Virtual Bids render the CAISO Day-Ahead Market software unable to process Bids submitted into the Day-Ahead Market.

(iii) Submitted Virtual Bids render the CAISO unable to achieve an alternating current (AC) solution in the Day-Ahead Market for an extended period of time.

(b) The CAISO may suspend or limit the ability of one or more Scheduling Coordinators to submit Virtual Bids if the CAISO determines that virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities cause or contribute to unwarranted divergence in prices between the Day-Ahead Market and the HASP or Real-Time Market. The CAISO will determine whether virtual bidding causes or contributes to unwarranted divergence in prices in the Day-Ahead Market and the HASP or Real-Time Market, as applicable, using the following methodology:

(i) The CAISO will calculate the average divergence between Day-Ahead prices and Real-Time prices for the CAISO Balancing Authority Area over a four (4) week period of time or such other period of time that the CAISO determines to be appropriate.

(ii) The CAISO will determine whether there are any Eligible PNodes and/or Eligible Aggregated PNodes at which: (A) the absolute value of the average divergence between Day-Ahead prices and Real-Time prices over that period of time or an appropriate subset of that period of time exceeded the system-wide average divergence in prices calculated pursuant to Section 39.11.2.2(b)(i), by a percentage established by the CAISO pursuant to the applicable Business Practice Manual and (B) the

virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities significantly contributed to this excess divergence.

(c) The CAISO may suspend or limit the ability of one or more Scheduling Coordinators to submit Virtual Bids if the CAISO determines that virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities cause or contribute to an unwarranted divergence in Shadow Prices between the Day-Ahead Market and the HASP or Real-Time Market that contributes to a significant divergence in LMPs at any Eligible PNode and/or Eligible Aggregated PNode. The CAISO will base each determination of whether virtual bidding causes or contributes to an unwarranted divergence in Shadow Prices in the Day-Ahead Market and the HASP or Real-Time Market on a calculation of the deviation between average hourly Shadow Prices in the Day-Ahead Market and the HASP or Real-Time Market, as applicable, during a rolling four (4) week period, or such other period that the CAISO determines to be appropriate given the virtual bidding activity under review. If the CAISO calculates that, over the time period employed in the CAISO's review, the virtual bidding activities of one or more Scheduling Coordinators on behalf of one or more Convergence Bidding Entities has resulted in a deviation between average hourly Shadow Prices in the Day-Ahead Market and the HASP or Real-Time Market (as applicable) the absolute value of which is greater than a percentage established by the CAISO pursuant to the applicable Business Practice Manual and such divergence in Shadow Prices contributes to a significant divergence in LMPs at any Eligible PNode and/or Eligible Aggregated PNode, the CAISO will determine that virtual bidding causes or contributes to an unwarranted divergence in Shadow Prices.

39.11.2.3 Procedures Regarding Suspension or Limitation

(a) Whenever practicable, prior to suspending or limiting virtual bidding, the CAISO will notify affected Scheduling Coordinators and affected Convergence Bidding Entities that the CAISO intends to suspend or limit virtual bidding and will confer and exchange information with the affected Scheduling Coordinators and affected Convergence Bidding Entities in an effort to resolve any dispute as to whether suspension or limitation of virtual bidding is warranted. In cases where taking such actions prior to suspending or limiting virtual bidding is not practicable, the CAISO will promptly notify the affected Scheduling Coordinators and affected Convergence Bidding Entities that the CAISO has suspended or limited virtual bidding, and will promptly confer and exchange information with the affected Scheduling Coordinators and affected Convergence Bidding Entities in an effort to resolve any dispute as to whether suspension or limitation of virtual bidding is warranted. Within two (2) Business Days of the notice of suspension or limitation, the CAISO will provide the affected Scheduling Coordinators and affected Convergence Bidding Entities with information justifying the decision to suspend or limit virtual bidding.

(b) The CAISO will submit to FERC supporting documentation, including any information provided to the CAISO by the affected Scheduling Coordinators and affected Convergence Bidding Entities, within ten (10) Business Days after any suspension or limitation of virtual bidding begins, unless the CAISO concludes prior to the end of the ten (10) Business Day period that the suspension or limitation of virtual bidding was or is not warranted. The CAISO will provide the affected Scheduling Coordinators and affected Convergence Bidding Entities with a copy of any supporting documentation submitted to FERC.

(c) Suspension or limitation of virtual bidding by the CAISO will remain in effect for ninety (90) days after the CAISO submits its initial supporting documentation to FERC, unless FERC directs otherwise or the CAISO determines that the suspension or limitation of virtual bidding should continue for fewer than ninety

(90) days. After the ninety (90) day period expires, the suspension or limitation of virtual bidding will remain in effect only if FERC permits or requires it to remain in effect.

(d) The CAISO will maintain the confidentiality of the identities of the affected Scheduling Coordinators and affected Convergence Bidding Entities until such time as FERC concludes that the circumstances or the conduct of the affected Scheduling Coordinators and affected Convergence Bidding Entities warranted suspension or limitation of virtual bidding.

(e) The CAISO will have the authority to discontinue the suspension or limitation of virtual bidding at any time it determines such suspension or limitation is no longer appropriate and will notify FERC if such suspension or limitation of virtual bidding is discontinued after supporting information concerning such suspension or limitation has been submitted to FERC.

* * *

Appendix A

Master Definition Supplement

* * *

Bid	Either (1) ~~A~~an offer for the Supply or Demand of Energy or Ancillary Services, including Self-Schedules, submitted by Scheduling Coordinators for specific resources, conveyed through several components that apply differently to the different types of service offered to or demanded from any of the CAISO Markets; or (2) a Virtual Bid.

* * *

CBEA	Convergence Bidding Entity Agreement

* * *

Convergence Bidding Entity (CBE)	An entity which has undertaken in writing by execution of a Convergence Bidding Entity Agreement to comply with all applicable provisions of the CAISO Tariff.
Convergence Bidding Entity Agreement (CBEA)	An agreement between the CAISO and a Convergence Bidding Entity, a pro forma version of which is set forth in Appendix B.

* * *

EAL	Estimated Aggregate Liability

* * *

Eligible Aggregated PNode	An Aggregated PNode located at an Intertie where virtual bidding is permitted, or an Aggregated PNode where either aggregated physical supply, a Default LAP, or a Trading Hub are located and where virtual bidding is permitted.

* * *

Eligible PNode	A PNode located at an Intertie where virtual bidding is permitted, or a PNode where either physical supply or demand is located and where virtual bidding is permitted.

* * *

Energy Bid	A Demand Bid, ~~or~~ an Energy Supply Bid, or a Virtual Bid.

* * *

Estimated Aggregate Liability (EAL)	The sum of a Market Participant's or CRR Holder's known and reasonably estimated potential liabilities for a specified time period arising from charges described in the CAISO Tariff, as provided for in Section 12.

* * *

Flow Impact	The combined impact of the CRR Holder's portfolio of Virtual Awards from the IFM on the power flows of a Constraint. The Flow Impact is calculated by multiplying the CRR Holder's Virtual Awards at a Node by

	the shift factor of that Node relative to the Constraint. This product is computed for each Node for which the Convergence Bidding Entity had Virtual Awards, and the Flow Impact is the sum of those products. In this definition, shift factor means the factor to be applied to a resource's expected change in output to determine the amount of flow contribution that change in output will impose on an identified transmission facility or flowgate.
	* * *
Market Participant	An entity, including a Scheduling Coordinator, who either: (1) participates in the CAISO Markets through the buying, selling, transmission, or distribution of Energy, Capacity, or Ancillary Services into, out of, or through the CAISO Controlled Grid; ~~or~~ (2) is a CRR Holder or Candidate CRR Holder; or (3) is a Convergence Bidding Entity.
	* * *
Net Hourly Energy Charge	Total charges to all Demand and Virtual Demand Awards minus total payments to all Supply and Virtual Supply Awards both based on the product of MWh amounts specified in all Day-Ahead Schedules and Virtual Awards and the relevant Day-Ahead LMPs at the applicable PNodes or Aggregated Pricing Node. This also includes any amounts associated with price corrections for Virtual Awards in accordance with Section 11.21.2.
	* * *
Real-Time Congestion ~~Fund~~Offset	For each Settlement Period of the HASP and RTM, the CAISO shall calculate the Real-Time Congestion ~~Fund~~ Offset as the difference of 1) the sum of the products of the ~~RTM or HASP MCC for Demand and~~total of the Demand Imbalance Energy and Virtual Supply liquidated as demand in the RTM or HASP, and the RTM or HASP MCC at the relevant Location; and 2) the sum of the products of ~~RTM or HASP MCC for Supply and~~ the total of the Supply Imbalance Energy and Virtual Demand liquidated as supply in the RTM or HASP, and the RTM or HASP MCC at the relevant Location; including also the sum of RTM and HASP Congestion Charges for Intertie Ancillary Services Awards, and

	excluding the HASP and RTM Congestion Credit for ETCs and TORs calculated as provided in Section 11.5.7.1. The Real-Time Congestion Offset is allocated as provided in Section 11.5.4.2.
~~**Real-Time Congestion Offset**~~	~~A component of the neutrality adjustments as provided in Section 11.5.4.2 to account for the distribution of excess Real-Time Congestion revenue and for the non-assessment o the Marginal Cot of Congestion to Measured Demand for ETCs and TOR Self-Schedules in the Real-Time as provided in Section 11.5.7.~~

* * *

Virtual Award	A Virtual Supply Award or a Virtual Demand Award.
Virtual Award Charge	The component of the Grid Management Charge that provides for the recovery of the CAISO's costs related to Virtual Awards. The methodology for determining the Virtual Award Charge is set forth in Appendix F, Schedule 1, Part A.
Virtual Bid	A Virtual Supply Bid or a Virtual Demand Bid.
Virtual Bid Curve	The Virtual Bid component that indicates the prices and related quantities at which a Virtual Supply Bid or a Virtual Demand Bid is submitted. For a Virtual Supply Bid, the Virtual Bid Curve is a monotonically increasing staircase function, consisting of no more than ten (10) segments defined by eleven (11) pairs of MW operating points and $/MWh, which may be different for each Trading Hour of the applicable Virtual Bid time period. For a Virtual Demand Bid, the Virtual Bid Curve is a monotonically decreasing staircase function, consisting of no more than ten (10) segments defined by eleven (11) pairs of MW operating points and $/MWh, which may be different for each Trading Hour of the applicable Virtual Bid time period.
Virtual Bid Reference Price	The price set forth in Section 12.8.2.
Virtual Bid Submission Charge	A charge assessed to a Scheduling Coordinator for each submitted Virtual Bid segment that is passed to the IFM.
Virtual Demand Award	The cleared Virtual Demand Bids in the IFM for a given hour.
Virtual Demand Bid	A Bid submitted in the DAM that, if cleared in the IFM, represents a commitment to pay for Energy at the LMP in the DAM and to receive revenues as specified in Section 11.3.

Virtual Supply Award	The cleared Virtual Supply Bids in the IFM for a given hour.
Virtual Supply Bid	A Bid submitted in the DAM that, if cleared in the IFM, represents a commitment to receive revenues for Energy at the LMP in the DAM and to make payments as specified in Section 11.3.

* * *

CAISO TARIFF APPENDIX B.15

Convergence Bidding Agreement

* * *

CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

AND

[CONVERGENCE BIDDING ENTITY]

CONVERGENCE BIDDING ENTITY AGREEMENT

CONVERGENCE BIDDING ENTITY AGREEMENT

THIS AGREEMENT is dated this _____ day of _____, _____, and is entered into, by and between:

(1) **[Full Legal Name]** having its registered and principal place of business located at **[Address]** (the "Convergence Bidding Entity");

and

(2) **California Independent System Operator Corporation,** a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate, initially 151 Blue Ravine Road, Folsom, California 95630 (the "CAISO").

The Convergence Bidding Entity and the CAISO are hereinafter referred to individually as a "Party" and collectively as the "Parties."

Whereas:

A. The CAISO Tariff provides that any entity that intends to submit Virtual Bids (which can only be submitted through a Scheduling Coordinator that is either the entity itself or a representative of the entity) must register and qualify with the CAISO and comply with the terms of the CAISO Tariff.

B. The Convergence Bidding Entity has completed the Convergence Bidding Entity application process and is eligible to submit Virtual Bids.

C. The CAISO Tariff further provides that any entity who wishes to submit Virtual Bids must meet all of the Convergence Bidding Entity requirements in the CAISO Tariff and the relevant Business Practice Manual.

D. The Convergence Bidding Entity intends to submit Virtual Bids and, therefore, wishes to undertake to the CAISO that it will comply with the applicable provisions of the CAISO Tariff.

E. The Parties are entering into this Agreement in order to establish the terms and conditions pursuant to which the CAISO and the Convergence Bidding Entity will discharge their respective duties and responsibilities under the CAISO Tariff.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, **THE PARTIES AGREE** as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

1.1 **Master Definitions Supplement.** All terms and expressions used in this Agreement shall have the same meanings as those contained in the Master Definitions Supplement in Appendix A of the CAISO Tariff.

1.2 **Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) "includes" or "including" shall mean "including without limitation";

(e) references to a Section, Article, or Schedule shall mean a Section, Article, or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

(f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented, or restated through the date as of which such reference is made;

(g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced, or restated from time to time;

(h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization, or other entity, in each case whether or not having separate legal personality;

(i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;

(j) any reference to a day, week, month, or year is to a calendar day, week, month, or year; and

(k) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

ARTICLE II

ACKNOWLEDGEMENTS OF CONVERGENCE BIDDING ENTITY AND CAISO

2.1 Scope of Application to Parties. The Convergence Bidding Entity and CAISO acknowledge that all Convergence Bidding Entities must sign a form of this Agreement in accordance with Section 4.14 of the CAISO Tariff.

ARTICLE III

TERM AND TERMINATION

3.1 Effective Date. This Agreement shall be effective as of the later of the date it is executed by both Parties or the date accepted for filing and made effective by FERC, if such FERC filing is required, and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

3.2 Termination

3.2.1 Termination by CAISO. Subject to Article V, the CAISO may terminate this Agreement by giving written notice to the Convergence Bidding Entity of termination in the event that the Convergence Bidding Entity commits any material default under this Agreement and/or the CAISO Tariff as it pertains to this Agreement which, if capable of being remedied, is not remedied within the time frame specified in the CAISO Tariff after the CAISO has given written notice of the material default to the Convergence Bidding Entity. The CAISO will not terminate this Agreement if the material default of the Convergence Bidding Entity is excused by reason of Uncontrollable Forces in accordance with Article X of this Agreement or if the CAISO agrees, in writing, to an extension of the time to remedy such material default. Any outstanding financial right or obligation or any other obligation under the CAISO Tariff of the Scheduling Coordinator that represents the Convergence Bidding Entity that has arisen while that Scheduling Coordinator was submitting Virtual Bids, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive until satisfied. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the filing of the notice of termination is made after the preconditions for termination have been met and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if filed with FERC, or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

3.2.2 Termination by Convergence Bidding Entity. In the event that the Convergence Bidding Entity no longer intends to submit Virtual Bids, it may terminate this Agreement, on giving the CAISO not less than ninety (90) days' written notice; provided, however, that any outstanding financial right or obligation or any other obligation under the CAISO Tariff of the Scheduling Coordinator that represents the Convergence Bidding Entity that has arisen while that Scheduling Coordinator was submitting Virtual Bids, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive until satisfied. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met and the CAISO files the notice of termination

within sixty (60) days after receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the Convergence Bidding Entity's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

ARTICLE IV

GENERAL TERMS AND CONDITIONS

4.1 Convergence Bidding Entity Requirements. The Convergence Bidding Entity must register and qualify with the CAISO and comply with all terms of the CAISO Tariff applicable to Convergence Bidding Entities.

4.2 Electronic Contracting. All submitted applications, bids, confirmations, changes to information on file with the CAISO and other communications conducted via electronic transfer (e.g., direct computer link, FTP file transfer, bulletin board, e-mail, facsimile or any other means established by the CAISO) shall have the same legal rights, responsibilities, obligations and other implications as set forth in the terms and conditions of the CAISO Tariff as if executed in written format.

4.3 Agreement Subject to CAISO Tariff. The Parties will comply with all applicable provisions of the CAISO Tariff. This Agreement shall be subject to the CAISO Tariff, which shall be deemed to be incorporated herein.

ARTICLE V

PERFORMANCE

5.1 Penalties. The Convergence Bidding Entity shall be subject to all penalties made applicable to Convergence Bidding Entities set forth in the CAISO Tariff. Nothing in this Agreement, with the exception of the provisions relating to the CAISO ADR Procedures, shall be construed as waiving the rights of the Convergence Bidding Entity to oppose or protest the specific imposition by the CAISO of any FERC-approved penalty on the Convergence Bidding Entity.

5.2 Corrective Measures. If the Convergence Bidding Entity fails to meet or maintain the requirements set forth in this Agreement and/or the CAISO Tariff, the CAISO shall be permitted to take any of the measures, contained or referenced in the CAISO Tariff, which the CAISO deems to be necessary to correct the situation.

ARTICLE VI

COSTS

6.1 Operating and Maintenance Costs. The Convergence Bidding Entity shall be responsible for all its costs incurred in connection with all its activities related to submittal of Virtual Bids.

ARTICLE VII

DISPUTE RESOLUTION

7.1 Dispute Resolution. The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the Convergence Bidding Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE VIII

REPRESENTATIONS AND WARRANTIES

8.1 Representation and Warranties. Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

ARTICLE IX

LIABILITY

9.1 Liability. The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the Convergence Bidding Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE X

UNCONTROLLABLE FORCES

10.1 Uncontrollable Forces Tariff Provisions. Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the Convergence Bidding Entity and references to the CAISO Tariff shall be read as references to this Agreement.

ARTICLE XI

MISCELLANEOUS

11.1 Assignments. Either Party may assign or transfer any or all of its rights and/or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and other CAISO Tariff requirements as applied to Convergence Bidding Entities. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest was an original Party to this Agreement.

11.2 Notices. Any notice, demand, or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the Convergence Bidding Entity and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes to Schedule 1 shall not constitute an amendment to this Agreement.

11.3 Waivers. Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

11.4 Governing Law and Forum. This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply, shall be brought in any of the following forums, as appropriate: (i) any court of the State of California, (ii) any federal court of the United States of America located in the State of California, except to the extent subject to the protections of the Eleventh Amendment of the United States Constitution or, (iii) where subject to its jurisdiction, before FERC.

11.5 Consistency with Federal Laws and Regulations. This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

11.6 Merger. This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

11.7 Severability. If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

11.8 Amendments. This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing herein shall be construed as affecting in any way the right of the CAISO to make unilateral application to FERC for a change in the rates, terms, and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the Convergence Bidding Entity shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA

and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein. The standard of review FERC shall apply when acting upon proposed modifications to this Agreement by the CAISO shall be the "just and reasonable" standard of review rather than the "public interest" standard of review. The standard of review FERC shall apply when acting upon proposed modifications to this Agreement by FERC's own motion or by a signatory other than the CAISO or non-signatory entity shall also be the "just and reasonable" standard of review. Schedule 1 is provided for informational purposes and revisions to that schedule do not constitute a material change in the Agreement warranting FERC review.

11.9 Counterparts. This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

California Independent System Operator Corporation

By: _____

Name: _____

Title: _____

Date: _____

[Name of Convergence Bidding Entity]

By: _____

Name: _____

Title: _____

Date: _____

SCHEDULE 1

NOTICES

[Section 11.2]

Convergence Bidding Entity

Name of Primary Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

Name of Alternative Representative: _____

Title: _____

Company: _____

Address: _____

City/State/Zip Code: _____

Email Address: _____

Phone: _____

Fax No: _____

CAISO

Name of Primary
Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email address: _____

Phone: _____

Fax: _____

Name of Alternative
Representative: _____

Title: _____

Address: _____

City/State/Zip Code: _____

Email address: _____

Phone: _____

Fax: _____

* * *

CAISO TARIFF APPENDIX F
Schedule 1

Grid Management Charge

Part A – Monthly Calculation of Grid Management Charge (GMC)

The Grid Management Charge consists of the following separate service charges: (1) the Core Reliability Services – Demand Charge, (2) the Core Reliability Services – Energy Exports Charge; (3) Energy Transmission Services – Net Energy Charge, (4) the Energy Transmission Services – Uninstructed Deviations Charge, (5) the Core Reliability Services/Energy Transmission Services – Transmission Ownership Rights Charge, (6) the Forward Scheduling Charge, (7) the Market Usage Charge, ~~and~~ (8) the Settlements, Metering, and Client Relations Charge, and (9) the Virtual Award Charge.

1. The rate in $/MW for the Core Reliability Services – Demand Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the total of the forecasted Scheduling Coordinators' metered non-coincident peak hourly demand in MW for all months during the year (excluding the portion of such Demand associated with Energy Exports, if any, as may be modified in accordance with Part F of this Schedule 1), reduced by thirty-four percent (34%) of the sum of all Scheduling Coordinators' metered non-coincident peak Demands occurring during the hours ending 0100 through 0600, or during the hours ending 2300 through 2400, every day, including Sundays and holidays; provided that if a Scheduling Coordinator's metered non-coincident peak Demand hour during the month occurs during the hours ending 0100 through 0600, or during the hours ending 2300 through 2400, every day, the rate shall be sixty-six percent (66%) of the standard Core Reliability Services – Demand Charge rate.

2. The rate in $/MWh for the Core Reliability Services – Energy Exports Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the total of the forecasted Scheduling Coordinators' metered volume of Energy Exports in MWh, excluding each Scheduling Coordinator's Energy Exports associated with Transmission Ownership Rights.

3. The rate in $/MWh for the Energy Transmission Services – Net Energy Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the total annual forecasted Metered Balancing Authority Area Load, excluding each Scheduling Coordinator's Metered Balancing Authority Area Load associated with Transmission Ownership Rights.

4. The rate in $/MWh for the Energy Transmission Services – Uninstructed Deviations Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the absolute value of total annual forecasted net Uninstructed Imbalance Energy (netted within a Settlement Interval summed over the calendar month) in MWh; provided that the rate for each Scheduling Coordinator's Participating Intermittent Resources will be assessed against the Uninstructed Imbalance Energy of such Participating Intermittent Resources netted over the Trading Month.

5. The rate in $/MWh for the Core Reliability Services/Energy Transmission Services – Transmission Ownership Rights Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the total annual forecasted Metered Balancing Authority Area Load associated with Transmission Ownership Rights.

6. The rate in $ per Schedule or $ per Inter-SC Trade for the Forward Scheduling Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of

this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the annual forecasted number of non-zero MW Day-Ahead and HASP Schedules, as may be modified in accordance with Part F of this Schedule 1, including all awarded Ancillary Service and Residual Unit Commitment Bids and all Inter-SC Trades, including Inter-SC Trades of IFM Load Uplift Obligations. This charge will be assessed separately with respect to Schedules and Inter-SC Trades.

7. The rate in $/MWh for the Market Usage Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the annual forecasted total purchases and sales (including out-of-market transactions) of Ancillary Services, Energy, Instructed Imbalance Energy, and net Uninstructed Imbalance Energy (with Uninstructed Imbalance Energy for Participating Intermittent Resources netted over the Trading Month and all other Uninstructed Imbalance Energy being netted within a Settlement Interval) in MWh. A Market Usage Charge rate will be calculated separately for two sets of CAISO Markets: (i) the Ancillary Services and RTM rate will be based on MWh of purchases and sales of Ancillary Services in the DAM, the HASP, and the RTM, MWh of Instructed Imbalance Energy, and MWh of Uninstructed Imbalance Energy netted over the Settlement Interval; and (ii) the rate for the Day-Ahead Market for Energy will be based on MWh of Day-Ahead Schedules. The rate for the Day-Ahead Market for Energy will be based on the sum, for all Scheduling Coordinators and all Settlement Periods, of the greater of the amount of MWh associated with each Scheduling Coordinator's Day-Ahead Schedule of Supply or the amount associated with its Day-Ahead Schedule of Demand for each Settlement Period.

8. The rate for the Settlements, Metering, and Client Relations Charge will be fixed at $1000.00 per month, per Scheduling Coordinator ID Code (SCID) with an invoice value other than $0.00 in the current Trading Month.

9. The rate in $/MWh for the Virtual Award Charge will be calculated by dividing the GMC costs, as determined in accordance with Part C of this Schedule 1, allocated to this service category in accordance with Part E of this Schedule 1, by the annual forecasted total virtual supply and virtual demand cleared in the IFM. This service category will be allocated a percentage of the Forward Scheduling Charge and Market Usage – Forward Energy service categories based upon the total annual forecasted cleared supply and demand. All amounts collected from the assessment of the Virtual Bid Submission Charge in a given year will be used to offset the amount of the Virtual Award Charge for the next year.

For a Scheduling Coordinator for a Load following MSS, the GMC service charges set forth in above shall be applied as set forth in Section 11.22.3 of the CAISO Tariff.

The rates for the foregoing charges shall be adjusted automatically each year, effective January 1 for the following twelve months, in the manner set forth in Part D of this Schedule.

Part B – Quarterly Adjustment, If Required

Each component rate of the Grid Management Charge will be adjusted automatically on a quarterly basis, up or down, so that rates reflect the annual revenue requirement as stated in the CAISO's filing or posting on the CAISO Website, as applicable, if the estimated revenue collections for that component, on an annual basis, change by more than five percent (5%) or $1 million, whichever is greater, during the year. Such adjustment may be implemented not more than once per calendar quarter, and will be effective the first day of the next calendar month.

The rates will be adjusted according to the formulae listed in Appendix F, Schedule 1, Part A with the billing determinant(s) readjusted on a going-forward basis to reflect the change of more than five percent

(5%) or $1 million, whichever is greater, from the estimated revenue collections provided in the annual informational filing.

Part C – Costs Recovered through the GMC

As provided in Section 11.22.2 of the CAISO Tariff, the Grid Management Charge includes the following costs, as projected in the CAISO's budget for the year to which the Grid Management Charge applies:

- CAISO Operating Costs;
- CAISO Other Costs and Revenues, including penalties, interest earnings and other revenues;
- CAISO Financing Costs, including debt service on CAISO Start Up and Development Costs and subsequent capital expenditures; and
- CAISO Operating and Capital Reserves Costs.

Such costs, for the CAISO as a whole, are allocated to the service charges that comprise the Grid Management Charge: (1) Core Reliability Services - Demand Charge, (2) Core Reliability Services – Energy Exports Charge, (3) Energy Transmission Services – Net Energy Charge, (4) Energy Transmission Services – Uninstructed Deviations Charge, (5) Core Reliability Services/ Energy Transmission Services – Transmission Ownership Rights Charge, (6) Forward Scheduling Charge, (7) Market Usage Charge, ~~and~~ (8) Settlements, Metering, and Client Relations Charge, and (9) Virtual Award Charge, according to the factors listed in Part E of this Schedule 1, and

adjusted annually for:

- any surplus revenues from the previous year as deposited in the CAISO Operating and Capital Reserves Account, or deficiency of revenues, as recorded in a memorandum account;

divided by:

- forecasted annual billing determinant volumes;

adjusted quarterly for:

- a change in the volume estimate used to calculate the individual Grid Management Charge components, if, on an annual basis, the change is five percent (5%) or $1 million, whichever is greater, from the estimated revenue collections provided in the annual informational filing.

The Grid Management Charge revenue requirement formula is as follows:

Grid Management Charge revenue requirement =

CAISO Operating Costs + CAISO Financing Costs + CAISO Other Costs and Revenues + CAISO Operating and Capital Reserves Costs,

[The "USoA" reference below is the FERC Uniform System of Accounts, and is intended to include subsequent re-numbering or re-designation of the same accounts or subaccounts.]

Where,

(1) CAISO Operating Costs include:

(a) Transmission expenses (USoA 560-574);

(b) Regional market expenses (USoA 575 subaccounts);

(c) Customer accounting expenses (USoA 901-905);

(d) Customer service and informational expenses (USoA 906-910);

(e) Sales expenses (USoA 911-917);

(f) Administrative & general expenses (USoA 920-935);

(g) Taxes other than income taxes that relate to CAISO operating income (USoA 408.1); and

(h) Miscellaneous, non-operating expenses, penalties and other deductions (USoA 426 subaccounts).

(2) CAISO Financing Costs include:

(a) For any fiscal year, scheduled principal and interest payments, sinking fund payments related to balloon maturities, repayment of commercial paper notes, net payments required pursuant to a payment obligation, or payments due on any CAISO notes. This amount includes the current year accrued principal and interest payments due in the first one hundred twenty (120) days of the following year.

(b) The debt service coverage requirement, which is a percentage of the senior lien debt service, i.e., all debt service that has a first lien on CAISO net operating revenues. The coverage requirement is twenty-five percent (25%), unless otherwise specified by the rate covenants of the official statements for each CAISO bond offering.

(3) CAISO Other Costs and Revenues include:

(a) Interest earnings (USoA 419) on CAISO Operating and Capital Reserves Account balances, excluding interest on bond or note proceeds specifically designated for capital projects or capitalized interest.

(b) Miscellaneous revenues (USoA 421 and 456 subaccounts), including but not limited to Scheduling Coordinator application and training fees, and fines assessed and collected by the CAISO.

(c) Other interest expenses (USoA 431) not provided for elsewhere.

(4) CAISO Operating and Capital Reserves Costs include:

(a) The projected CAISO Operating and Capital Reserves Account balance for December 31 of the prior year less the reserve requirement. If such amount is negative, the amount may be divided by two, so that the reserve is replenished within a two-year period. The reserve requirement is fifteen percent (15%) of annual CAISO Operating Costs, unless otherwise specified by (1) the rate covenants of the official statements for each CAISO bond offering, (2) the CAISO Governing Board or (3) the FERC.

(b) Funding from current year revenues for approved capital and projects initiated in the fiscal year.

A separate revenue requirement shall be established for each component of the Grid Management Charge by developing the revenue requirement for the CAISO as a whole and then assigning such costs to the service categories using the allocation factors provided in Appendix F, Schedule 1, Part E.

* * *

Part E – Cost Allocation

1. The Grid Management Charge revenue requirement, determined in accordance with Part C of this Schedule 1, shall be allocated to the service charges specified in Part A of this Schedule 1 as follows, subject to Section 2 of this Part E and to Part F of this Schedule 1. Expenses projected to be recorded in each cost center shall be allocated among the charges in accordance with the allocation factors listed in Table 1 to this Schedule 1, subject to Section 2 of this Part E and to Part F of this Schedule 1. In the event the CAISO budgets for projected expenditures for cost centers are not specified in Table 1 to Schedule 1, such expenditures shall be allocated based on the allocation factors for the respective CAISO division hosting that newly-created cost center. Such divisional allocation factors are specified in Table 1 to this Schedule 1.

Debt service expenditures for the CAISO's existing bond offerings shall be allocated among the charges in accordance with the allocation factors listed in Table 1 to this Schedule 1, subject to Section 2 of this Part E and to Part F of this Schedule 1. Capital expenditures shall be allocated among the charges in accordance with the allocation factors listed in Table 2 to this Schedule 1, subject to Section 2 of this Part E and to Part F of this Schedule 1, for the system for which the capital expenditure is projected to be made.

Any costs allocated by the factors listed in Table 1 and Table 2 to the Settlements, Metering, and Client Relations Charge category that would remain un-recovered after the assessment of the charge for that service specified in Section 8 of Part A of this Schedule 1 on forecasted billing determinant volumes shall be reallocated to the remaining GMC service categories in the ratios set forth in Table 3 to this Schedule 1.

The cost allocation factors in Tables 1, 2, and 3 to this Schedule 1 include the following association of factors to the components of the Grid Management Charge, subject to Part F of this Schedule 1:

CRS: This factor is the allocation of costs to the Core Reliability Services – Demand Charge and Core Reliability Services - Energy Exports Charge.

ETS: This factor is the allocation of costs to the Energy Transmission Services – Net Energy Charge and Energy Transmission Services – Uninstructed Deviations Charge, subject to Section 2 of this Part E.

CRS/ETS TOR: This factor is the allocation of costs to Core Reliability Services/Energy Transmission Services – Transmission Ownership Rights Charge for the assessment of the Core Reliability Services – Demand Charge, Core Reliability Services – Energy Exports Charge, and the Energy Transmission Services – Net Energy Charge to Metered Balancing Authority Area Load served over Transmission Ownership Rights.

FS: This factor is the allocation of costs to the Forward Scheduling Charge.

MU: This factor is the allocation of costs to the Market Usage Charge, except for the application of the Market Usage Charge to purchases or sales of Energy in the Day-Ahead Market.

MU-FE: This factor is the allocation of costs to the Market Usage Charge as applied to net purchases or sales of Energy in the Day-Ahead Market.

SMCR: This factor is the allocation of costs to the Settlements, Metering, and Client Relations Charge.

The allocation of costs to cost allocation factors FS and MU-FE includes the allocation of costs to the Virtual Award Charge.

2. The allocation of costs in accordance with Section 1 and Tables 1 and 2 of this Part E shall be adjusted as follows:

Costs allocated to the Energy Transmission Services (ETS) category in the following tables are further apportioned to the Energy Transmission Services – Net Energy Charge and Energy Transmission Services – Uninstructed Deviations Charge subcategories in eighty percent (80%) and twenty percent (20%) ratios, respectively.

* * *

Attachment C – Declaration of Khaled Abdul-Rahman

Convergence Bidding Amendment

ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	**)**	**Docket No. ER10-___-000**

DECLARATION OF KHALED ABDUL-RAHMAN ON BEHALF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

I. Introduction

Q. Please state your name and business address.

A. My name is Khaled Abdul-Rahman. My business address is 151 Blue Ravine Road, Folsom, California 95630.

Q. By whom and in what capacity are you employed?

A. I am employed as Principal, Power Systems Technology Architecture and Development for the California Independent System Operator Corporation ("ISO").

Q. Please describe your professional and educational background.

A. I have worked in the electric power system industry for over a decade, focusing primarily on management and software design. Between March 2006 and July 2009 I was employed as the Independent Principal Consultant for Electricity Markets at Siemens Transmission & Distribution, where my responsibilities included supporting Energy Market Management software areas and putting the Security Constrained Unit Commitment and Constrained Dispatch software used

in the new ISO market into action. Since July, I have worked for the ISO as the Principal for Power Systems Technology Architecture and Development. My current responsibilities include tasks related to the implementation of scarcity pricing, and the development of a strategy to handle industry changes anticipated over the next five to ten years. My *curriculum vitae* is provided in Appendix 1 to my declaration.

Q. What is the purpose of your declaration in this proceeding?

A. I will discuss two matters in my declaration. First, I will explain how the ISO's process for aggregating and de-aggregating virtual bids at each location will work. I will also show that the aggregation and de-aggregation will be a strictly internal automated ISO process that will have no adverse effect on market participants. Second, I will discuss the ISO's use of an alternating current (AC) solution and nodal megawatt (MW) constraints when convergence bidding is implemented. As I will explain, these mechanisms will be primarily automated in nature, will involve only minimal manual actions by the ISO, and will treat physical and virtual bids equally.

II. <u>Aggregation and De-Aggregation of Virtual Bids</u>

Q. What is the purpose of the ISO's process for aggregating and de-aggregating virtual bids?

A. The ISO's process for aggregating and de-aggregating virtual bids is intended solely to address a specific issue. Implementation of convergence bidding has the potential to increase the number of bids in the day-ahead market to a level

that the ISO's day-ahead market software cannot handle. The process for aggregating and de-aggregating virtual bids will allow the ISO's market software to process day-ahead bids even when a high volume of virtual bids is submitted.

Q. How will the aggregation and de-aggregation of virtual bids work?

A. At the close of the day-ahead market (approximately 10:00 a.m.), the market software will aggregate the bid segments submitted by all of the scheduling coordinators at each location to create composite bid curves of virtual supply bids and virtual demand bids for use in the IFM optimization. The ISO will then conduct the day-ahead market processes using physical bids and the aggregated virtual bids. After the market software determines the optimal solution and thus the cleared quantities at each location, the market software will de-aggregate the aggregated virtual bid results into individual cleared virtual bid results and will assign the virtual bid awards back to the correct scheduling coordinators. The ISO will then publish the day-ahead market results, including the virtual bid awards.

Q. Has the ISO explained to stakeholders how the aggregation and de-aggregation of virtual bids will work?

A. Yes. At a meeting of the Market Performance and Planning Forum held on March 16, 2010, I gave a presentation to stakeholders that included discussion of how aggregation of virtual bids will work and provided numerical examples. This portion of my March 16 presentation is provided as Appendix 2 to my declaration.

Q. Could you discuss the numerical examples you provided?

A. Yes. Assume that three scheduling coordinators (SC1, SC2, and SC3) submit the following virtual supply bid curve values (expressed in paired MW and dollar amounts) at the same location:

- SC1: (0 MW, $25), (25 MW, $32), (50 MW, $35), (75 MW, $37) (100 MW, $37)
- SC2: (0 MW, $35), (50 MW, $45), (100 MW, $45)
- SC3: (0 MW, $30), (10 MW, $35), (20 MW, $45), (30 MW, $47), (40 MW, $47)

The ISO's market software will combine the three individual virtual supply bid curves for SC1, SC2, and SC3 that have these values into an aggregated virtual supply bid curve that has the following values:

(0 MW, $25), (25 MW, $30), (35 MW, $32), (60 MW, $35), (145 MW, $37), (170 MW, $45), (230 MW, $47), (240 MW, $47)

These aggregate bid curve values were calculated using the following methodology. The total MW of all three curves combined equals 240 MW, which represents the upper bound of the bid curve. Zero MW represents the lower bound based on the three individual bid curves. When looking at all three bid curves, there is a total of 25 MW (*i.e.*, the range from 0 MW to 25 MW in the aggregated bid curve values shown above) priced at $25, all from the range in

SC1's bid curve from 0 MW to 25 MW. This represents the first bid segment. There is a total of 10 MW (*i.e.*, the range from 25 MW to 35 MW in the aggregated bid curve values shown above) priced at $30, all from the range in SC3's bid curve from 0 MW to 10 MW. This represents the second bid segment. There is a total of 25 MW (*i.e.*, the range from 35 MW to 60 MW in the aggregated bid curve values shown above) priced at $32, all from the range in SC1's bid curve from 25 MW to 50 MW. This represents the third bid segment. There is a total of 85 MW (*i.e.*, the range from 60 MW to 145 MW in the aggregated bid curve values shown above) priced at $35, based on summing the range in SC1's bid curve from 50 MW to 75 MW (*i.e.*, 25 MW), the range in SC2's bid curve from 0 MW to 50 MW (*i.e.*, 50 MW), and the range in SC3's bid curve from 10 MW to 20 MW (*i.e.*, 10 MW). This represents the fourth bid segment. The same process continues from there to form three more bid segments in the example above.

These aggregated virtual supply bid curve values represent the total virtual supply to be considered at the location and are the values the market software will use in the IFM. After the IFM clears, the virtual supply awards will be sent to the individual scheduling coordinators based on their contributions to the cleared MWs.

Q. Please go on.

A. To continue with the example I have discussed, assume that the IFM clears at $35 at the location for 130 MW. Any bid segments under $35 will clear. Because SC1, SC2, and SC3 each submitted a $35 bid segment, and that bid segment is at the price margin, the MW priced at $35 will be awarded pro rata to SC1, SC2, and SC3. As shown in the example I have discussed, there is a total of 85 MW priced at $35, based on summing the 25 MW range in SC1's bid curve, the 50 MW range in SC2's bid curve, and the 10 MW range in SC3's bid curve. Thus, SC1 will receive approximately 29 percent (*i.e.*, 25 MW divided by 85 MW) of the pro rata award, SC2 will receive approximately 59 percent (*i.e.*, 50 MW divided by 85 MW) of the pro rata award, and SC3 will receive approximately 12 percent (*i.e.*, 10 MW divided by 85 MW) of the pro rata award. Further, the amount of the pro rata award will be 70 MW (*i.e.*, the 130 MW bid clearing value minus the 60 MW value in the aggregated bid curve at the $35 bid clearing price). As a result, the final virtual bid awards at the location will be:

- SC1: 25 MW [*i.e.*, the range in SC1's bid curve from 0 MW to 25 MW] + 25 MW [*i.e.*, the range in SC1's bid curve from 25 MW to 50 MW] + (0.29 x 70 MW) = 70.3 MW
- SC2: (0.59 x 70 MW) = 41.3 MW
- SC3: 10 MW [*i.e.*, the range in SC3's bid curve from 0 MW to 10 MW] + (0.12 x 70 MW) = 18.4 MW

These are exactly the same final virtual bid awards that SC1, SC2, and SC3 would have received if their individual bid curves had not been aggregated.

Q. Will the process for aggregating and de-aggregating virtual bids be a manual process or an automated process?

A. It will be an implementation detail built into the ISO's automated market software to enable the market software to handle any large influx of virtual bids. Thus, it will be strictly an automated process.

Q. Will the aggregation and de-aggregation of virtual bids have any detrimental effect on market participants?

A. No. The aggregation and de-aggregation process will have no impact on market participants. In particular, the aggregation and de-aggregation process will have no adverse effect on final virtual bids awards. As I indicated earlier with regard to the example I discussed, market participants will receive the same final virtual bid awards they would have gotten if the process were not in effect (assuming that the ISO's market software were able to handle even an extremely large bid volume). This feature of the convergence bidding design simply preserves the ability of market participants to submit virtual bids without compromising the ISO's bidding infrastructure even if the bid volume becomes extremely large due to the introduction of convergence bidding.

III. Use of AC Solution and Nodal MW Constraints

Q. How will the ISO use an AC solution and nodal MW constraints when convergence bidding is implemented?

A. The ISO will achieve an AC solution in the day-ahead market to the extent practicable. If and when it is impracticable to achieve an AC power flow solution without the initial enforcement of nodal MW limit constraints, the ISO will apply nodal MW constraints to Eligible PNodes (except for Eligible PNodes established for interties) using the following three-step process:

(1) The ISO will calculate a MW limit for each Eligible PNode other than an Eligible PNode established for an intertie. For an Eligible PNode associated with physical supply resource, the MW limit will be equal to a factor multiplied by the PMax of the physical supply resource. For an Eligible PNode associated with a physical demand resource, the MW limit will be equal to a factor multiplied by the nodal load forecast of the Eligible PNode calculated as the MW portion of the system demand forecast that is distributed to the Eligible PNode accordingly to the corresponding system load distribution factor associated with the Eligible PNode. The factors used in these calculations will be determined in accordance with a process set forth in the Business Practice Manuals.

(2) For each of the Eligible PNodes or group of Eligible PNodes, the ISO will calculate the percentage by which the sum of the MW amounts of all energy supply bids, demand bids, and virtual bids exceeds the MW limit calculated pursuant to step (1).

(3) Starting with the Eligible PNodes or group of Eligible PNodes at which the MW limits would be exceeded by the largest percentages, and working in descending order of the Eligible PNodes or group of Eligible PNodes that exceed their MW limits ranked by the extent to which the corresponding MW limits would be exceeded, the ISO will apply the MW limits to all energy supply bids, demand bids, and virtual bids at the applicable Eligible PNodes or group of PNodes and run iterations of the integrated forward market until the ISO markets can achieve an AC solution. The application of the MW limit will be enforced by means of a MW limit constraint on the sum of the nodal energy supply bids, demand bids, and virtual bids as well as the portions of the aggregate energy supply bids, demand bids, and virtual bids that are applicable to Eligible PNodes or group of PNodes. The MW limit constraints will be enforced in the integrated forward market optimization engine to curtail the bids at the Eligible PNodes or group of PNodes that have been identified as candidates for causing AC convergence issues. The integrated forward market optimization engine will use the economic criteria based on bid prices and effectiveness of bids to mitigate the violation of the MW limit at the Eligible PNode or group of PNodes.

Q. Will the use of an AC solution and nodal MW constraints be mainly automated or will it primarily involve manual actions by the ISO?

A. The megawatt limit constraints will be mainly automated in nature and will involve only minimal manual action by the ISO.

Q. Please explain.

A. The ISO's market software will rank the Eligible PNodes or groups of PNodes that exceed their MW limits by the extent to which their corresponding MW limits would be exceeded. Starting at the top of that list of candidates for causing AC convergence issues, the market software will apply the MW limits to all energy supply bids, demand bids, and virtual bids at the applicable Eligible PNodes or group of PNodes and run iterations of the integrated forward market until the ISO markets can achieve an AC solution. The only manual action by the ISO will be the determination of how far down the list the ISO needs to go before it runs each iteration of the integrated forward market. This determination will partly depend on where key or weak locations on the transmission system are ranked in the list. Through market simulation and testing that will be conducted prior to the implementation of convergence bidding, the ISO will gain a better understanding of how far down the list it will need to go before it runs each iteration. The ISO will continue to fine-tune its understanding as needed both before and after convergence bidding is implemented.

Q. Will the use of an AC solution and nodal MW constraints treat physical and virtual bids equally?

A. Yes. The ISO will apply the AC solution and nodal MW constraints to all bids equally, without making any distinction between physical and virtual bids.

Q. Has the ISO explained to stakeholders how the use of the AC solution and nodal MW constraints will work?

A. Yes. At two meetings of the Market Performance and Planning Forum, held on March 16 and April 27, 2010, I gave presentations to stakeholders that included discussion of how the use of the AC solution and nodal MW constraints will work when convergence bidding is implemented. These portions of my March 16 and April 27 presentations are provided as Appendix 3 to my declaration.

Q. Does this conclude your declaration?

A. Yes.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge.

Executed on June 23, 2010.

K. H. AbdulRahman

Khaled Abdul-Rahman

Appendix 1 to Declaration of Khaled Abdul-Rahman

Convergence Bidding Amendment

ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

Dr. KHALED H. ABDUL-RAHMAN
Principal, California ISO
Power Systems Technology Architecture & Development
Tel: 916.802.0026 | Fax: 916.351.2487 | E-mail: *kabdul@caiso.com*
151 Blue Ravine Rd., Folsom, CA 95630

Summary
Dr. Khaled Abdul-Rahman offers high caliber consulting services developed over 15 years experience in a variety of applications related to Electricity Markets Design, software implementation, Testing, and on-line deployment. Dr. Abdul-Rahman's deep knowledge of the electrical power industry restructuring coupled with his advanced technical and analytical skills, information technology experience, and his management and personal skills make him a perfect fit to assume key roles in projects related to various aspects of the electric power system industry.

Dr. Abdul-Rahman has been closely involved with various different types of entities in this industry including academic institutions, vertical electric utilities, independent system operators, power systems software vendors, Database vendor, and consulting firms. Specifically, Dr. Abdul-Rahman career involves working on projects at:

- California Independent System Operator (CAISO): Non-profit Transmission Grid Operator and Electricity Markets Facilitator
- Siemens Energy: Major EMS and Electricity Market Systems vendor for ISOs and electric Utilities in the area of energy management and automation.
- Energy Consulting Company, International: A recognized International Consulting firm in the area of Power Systems and Electricity Markets design, operations, and market performance evaluations.
- Alliance Regional Transmission Operator (ARTO): For-Profit Transmission Grid Operator
- Illinois Power Company: Electric Utility
- Florida Power and Light: Electric Utility
- Siemens, ABB, and ESCA: Recognized major vendors for Energy Management Systems, and integrated Electricity Markets software in the US and abroad.
- Open Access Technology International: Major vendor for Tagging & Scheduling, OASIS, Portfolio management software
- Oracle Corporation: Major vendor for Database and Information Managment software
- Sargent & Lundy Engineers: A recognized International Consulting Firm in the area of nuclear and coal power plant stations design.
- Illinois Institute of Technology (IIT): A recognized International Academic and Research Institution.

PROFESSIONAL EXPERIENCE

Leadership Experience and Major Achievements:

California Independent System Operator (CAISO) (July 2009 – Present)- **Principal, Power Systems Technology Architecture & Development**

Responsibility includes working closely with various Internal CAISO groups including Project Management Office, Market Infrastructure & Development, Market Operations, Grid Operations, and Legal and Tariff groups, as well as external entities such as Market Participants and software vendors. Current Responsibilities include:

- Develop business requirements, detailed software design, software implementation, testing, and deployment plans for the following projects:
    - **Virtual Convergence Bidding in Day-Ahead Market**: bid volume limits, AC power flow issues, market power mitigation, reliability must-run issues, software testing, and market simulations plans.
    - **Scarcity Pricing**: Ancillary Services Marginal Price under AS scarcity situations.
- **Strategy Framework Project**: Core Team member to develop a detailed strategy plan and roadmap for CAISO for the next 5 to 10 years to cope with industry changes related to increased integration of renewable resources, advances in smart grid technologies, and other environmental and policy drivers.
- **CAISO Training Academy**: Instructor for power system analysis and market optimization training classes for CAISO employees.

Siemens Transmission & Distribution – Energy Management & Automation Division, (March 2006 – July 2009)**, Independent Principal Consultant – Electricity Markets**

Responsibilities include: Provide Functional Definition and Business Requirement support in the Energy Market Management software areas; Accomplish design and implementation tasks within the Security Constrained Unit Commitment and Constrained Dispatch software; Provide application support and functional expertise on Siemens' customer sites; Assist Siemens's customers with application testing activities; Provide Analysis of complex analytical scenarios based on implemented market design rules; Provide Business knowledge and recommendation for the integration of market system with other customer's legacy systems; Provide on-site support for cutover, and Go-Live activities.

Energy Consulting Company International (ECCO), (Mar 2001 – Feb 2006), **Independent Electricity Markets & Power Systems Managing Principal Consultant**

California ISO (July 2002 – Jan 2006)- *Subcontractor for ECCO:*

Assisting California ISO in its effort in re-designing all market applications including Full Network Modeling of the CAISO system, Integrated Forward Market, and Real-Time Nodal LMP market. This Market Re-design Technology Upgrade (MRTU) project involves switching from zonal pricing to a full network model, and Locational-Marginal Pricing (LMP) on the nodal level. This effort involves:

- CAISO Test Team Lead for managing the daily Testing of ***Siemens*** Forward and Real-Time Markets software including the following functions: Market Power Mitigation (MPM), Integrated Day-ahead forward Market, Reliability Unit Commitment (RUC), Integrated

Hour-Ahead Process, Real-time Pre-Dispatch, Interval Dispatch, Contingency Dispatch, Manual Dispatch, and Very-Short-Term-Load-Prediction (VSTLP). The software involves state-of-the-art modeling for complicated features such as dynamic ramp rates as a function of resources' MW, prohibited regions, network constraints with AC power flow, nomograms, co-optimization of energy and A/S services, as well as the use of the Common Information Model (CIM) and additional extensions for network and market data representations. The Siemens' software is based on the ILOG-CPLEX optimization library to solve the mixed integer programs of the different markets.

- Assist in the requirements definition, software design, and managed the daily software testing of the Integrated Forward Market and the Real-Time markets including the co-optimization of energy and ancillary services, Market Power Mitigation (MPM), and Reliability Unit Commitment (RUC) applications.
- Member of the Congestion Revenue Rights (CRR) implementation Team.
- Assist in resolving modeling issues related to the use of full AC network model inside California ISO control area.
- Assist in identifying criteria, and resolving issues related to CAISO State Estimator (SE) which is used as a feed to the RTN market.
- Assist in writing functional requirements for the forward markets Request For Proposal (RFP).
- Assist in the screening, evaluation, and selection process of the market software vendor.
- Member of the forward markets Content Team to assess the technical capabilities/shortcomings of the different candidate vendors.
- Assist in the unit commitment data collection and results analysis of the CAISO Forward Market Proof-of-Concept (POC) project using ***Siemens***'s Security Constrained Unit commitment (SCUC) software package.
- Member of the CAISO Real-Time market application validation and Testing Team to perform Factory Acceptance Test for the ***ABB***'s Real-Time software package. This effort involved testing SCED optimization engine, testing SCUC optimization engine, testing out-of-market sequence (OOS).
- Member of a CAISO team for utilizing ***ABB***'s transmission constrained unit commitment software to assist Grid Operators issue the waiver denial instructions for must-offer resources.

Cap Gemini Ernst & Young (CGEY) (Mar 2001 – Dec 2001),)- *Subcontractor for ECCO*
Member of the Cap Gemini Ernst & Young Project Management Office for the Alliance Regional Transmission Organization (RTO) in the area of Market Operation Applications to coordinate between the different software vendors.

- Lead software Tester for the **Alliance RTO** Imbalance Energy Market software including testing and verifying the market user interface for portfolio definitions and bids submission, interfaces to load forecast, tagging &scheduling, loss calculator, real time data, security coordinator, NERC IDC, optimal market dispatch of bids, and imbalance charge calculations under both pay-as-bid and pay-as-MCP pricing mechanism.
- Training of the Alliance RTO Imbalance Energy Market Coordinator personal to review and confirm imbalance bids from generation suppliers, watch for abnormalities in quantity or

pricing curves, analyze changing internal load trends taking into consideration season, time of day and weather changes.

- Technical lead for the Alliance RTO data conversion activities including Service Points, Paths, Flowgates, and OASIS Users information.
- Technical lead for the conversion of the metadata describing Alliance RTO real-time data points from the Inter-regional Security Network (ISN) format to *Siemens* Inter-Control-Center-Protocol (ICCP) XML format
- Developed Technical Training material about the Alliance RTO in the areas of OASIS, Tagging & Scheduling, Imbalance Engine, Security Coordinator, and general overview if the electric energy deregulation and the different industry models.
- Member of the Alliance RTO Technical Team. Participated in the definition requirement, design and business processes of the real time Imbalance Energy Market based on Locational Marginal Pricing (LMP) with provisions to settle as pay-as-bid or pay-as-market-clearing-price.

ECCO International, (Mar 2001 – Present), **Independent Electricity Markets & Power Systems Managing Principal Consultant**

- Provide consulting services in areas related to the de-regulated electricity market including generating reports summarizing the strengths and drawbacks of PJM electricity market and a comparison of *PJM, New York ISO, ISO New England* and *ERCOT* electricity markets. (*Direct Time & Material Contract*)
- Assist in writing an *EPRI* Research Report on "Integrated Engineering and Economic Operation of Power Systems" (*Direct Time & Material Contract*)

Illinois Power Company (subsidiary of Dynegy), (Jan 2002 – July 2002), **Independent Power Systems Principal Consultant**

- Technical Project Lead for developing Illinois Power (IP)'s real time Network Model to run network topology, state estimator, power flow and contingency ranking & analysis using PTI's PSS/O API calls to an Oracle Database Implementation of the power system Common Information Model (CIM). The developed tool assists IP's control center operators study their power system behavior, evaluate switching conditions, check any system configuration for operating problems, and help operate the system in an economical and secure manner. (*Direct Time & Material Contract*)

Open Access Technology International (OATI), Inc., (Feb 2002 – June 2002), **Independent Power Systems Principal Consultant**

Project Manager and software Lead Developer for OATI's Automated Decision Support tool for Bidding (ADSB) software. The project involves database integration, User interface development and algorithm enhancements to the ADSB software. The ADSB software identifies optimal bidding strategies for energy, spinning and non-spinning reserves markets. ADSB uses market information together with information on the generating units, fuel costs, O&M, bilateral agreements, and other positions to help generate optimal bidding strategies for energy, spinning, and non-spinning reserves markets. (*Direct Fixed Cost Contract*)

Oracle Corporation, Oracle Consulting for Electric Utilities, (Nov 1998 – Feb 2001), **Managing Principal Consultant**

- Technical Lead for a discovery phase team to put together a technical architecture plan and proposal for the migration of AT&T Global Operation accounting legacy system to Oracle Technology.
- Technical lead for proposing Oracle On-line Marketing package to *SBC* (Ameritech).
- Functional Team Lead for the utility billing requirements for *ORCOM* (Denver, CO - Scottsbluff, NE - Bend, OR). This is part of a discovery phase for the implementation of a complete Oracle solution for Customer Information System (CIS), Customer Relationship Management (CRM), ERP and Data Warehouse portal. ORCOM is an Application Service Provider (ASP) for CIS and CRM applications to customers ranging from energy service providers (ESP) to utility distribution companies (UDC).
- Provided functional expertise to *BC Hydro Grid Operation Group*, Vancouver, Canada, in the area of Transmission and Energy Scheduling under a joint effort with *ALSTOM ESCA*. This effort included definition of functional requirement and process flows for curtailment, buy-at-market, alternate POR/POD, firm, non-firm and secondary transmission reservations and ATC calculations and updates to OASIS among other things.
- Provided preliminary technical architecture design and functional requirements for the ISO/PXs CIO Council in North America. The Council consists of all Independent System Operators and Power Exchanges in North America.
- Technical Lead for the assessment of the *California ISO* internal Data Warehouse development Project, Sacramento, CA, including gathering information about the processes and data flows between the various market functions and operational systems.
- Project Lead for the *Nevada Power Services* (NPS) Project, Las Vegas, NV, for the integration of NPS 3rd party systems (Lodestar, Banner, Proform and Energy Trading applications) and design of data storage and user interface requirements
- Project Manager and Functional Lead for the Electric Power Research Institute (EPRI) Project, Palo Alto, CA to integrate its Topology Processor application to Oracle-based Common Information Model (CIM) database via Control Center Application Program Interface (CCAPI)
- Representing the US power industry in an Oracle Global Energy Team to identify future software requirements and products needed for Energy Trading. This effort involved studying the needs of different energy markets in US, and Europe. Meetings were conducted in the US, Canada, England, France, and Sweden with various vendors in this area.
- Representing Oracle in the Control Center Application Interface (CCAPI) Committee of the Electric Power Research Institute (*EPRI*) Common Data Access Task Force in 1999.

Siemens Power Systems Control, (Nov 1994 – Mar 1998), **Software Applications Lead Engineer**

- Technical Team lead for the development of Resource Scheduling and Bid Evaluation software for *Siemens*; a major Energy Management Systems (EMS) vendor in the power systems industry.
- Technical lead for the design phase of the PJM Unit Commitment program and its interface with the Generation Database (GDB).

- Responsible for Identifying new models and solution algorithms for linear and nonlinear optimization problems with various constraints such as fuel, emission, transmission network and comprehensive transactions models.
- Technical lead for the Oracle-based Florida Power and Light (FPL) Unit Commitment project. This effort involved data migration from the Cyber system to Oracle DB on Unix, and migration of displays and interfaces from FPL legacy systems.
- Technical Lead in the area of Unit Commitment for Al-Salvador and Israel Energy Management Systems.

Energy Management Systems (EMS) Software Development Experience:

Siemens Power Systems Control, (Nov 1994 – Mar 1998)

- Developed a prototype for a Price Based Unit Commitment with generation and demands bids.
- Developed and integrated a Security Constrained Unit Commitment base product for Siemens Power Systems Control. The software is based on the augmented Lagrange relaxation optimization technique and considers physical unit constraints as well as system operating constraints such as demand, reserve and network transmission constraints. The software used Oracle as its relational database and ORACLE Forms as the user input/output interface. This software product is operational at many national and international Energy Management Control Centers.
- Implemented the first distributed computing approach for unit commitment using parallel virtual machines (PVM) software.
- Developed a very specialized approach and solution technique for Short/Mid-Term Unit Commitment incorporating fuel allocation, transmission line flow limits, and area generation protection constraints for a major power utility.
- Coded and tested Interface software between SCADA and EMS functions for Siemens Power Systems Control.
- Developed active and reactive power optimization packages for power systems operation.

Power Systems Analytical Studies:

Sargent & Lundy Engineers, Sr. Electrical Analytical Engineer, (April 1998 – Oct 1998)

- Performed transmission system interconnection and impact studies due to planned capacity addition and/or re-powering of generation plants
- Performed Transient analysis and Short circuit fault current calculations for a nuclear power station in Wisconsin, USA.
- Developed and tested a Mathcad calculation shell program for the Ampacity of wrapped cable trays for a nuclear power station in mid-Illinois, USA.

Illinois Institute of Technology (IIT), Lecturer and Sr. Researcher, (Jan. 1994 – Oct.1994)

- Developed an artificial intelligence approach utilizing fuzzy set theory, neural networks and expert system to solve the reactive power optimization problem.

- Co-Principal investigator for studying the effects of regional power transfers and open transmission access on real-time power system control (the first US Department of Energy sponsored project in this area).

Marketing and Sales Technical Support Experience:

- I have the sole responsibility for marketing and selling my consulting services as an independent Consultant to various electric utilities, RTOs/ISOs, power systems software vendors, and other energy consulting companies (2001-Present).
- Technical Lead for a Discovery Phase Team to put together a technical architecture plan and proposal for the migration of AT&T Global Operation accounting legacy system to Oracle Technology (2000).
- Technical lead for proposing Oracle On-line Marketing package to SBC (2001).
- Prepared various proposals for Electric Utilities, Energy Trading companies, Independent System Operators (ISO), and the Electric Power Research Institute (EPRI) (1998 –2001).
- Helping Oracle Sales Force understand the electric industry business and practices and support them to gain customers' trust in Oracle's understanding of the electric business requirements (1999-2001).
- Providing technical support for Oracle Marketing and Sale in the area of data warehousing and Oracle decision support tools (Reports, Discoverer, Express) for the electric power industry (1999-2001).
- Contributed to various proposals for many investors and electric utilities in different areas of power systems transmission and generation (1999-2000).
- Prepared and presented thermal Unit Commitment demos to various potential customers and responded to their technical questions and concerns in the area of short-term scheduling (1994-1998).
- Conducted training sessions on thermal Unit Commitment (1996-1997).

TECHNICAL PROFICIENCIES

Power System Industry:

- **Deregulation**: Integrated Forward markets, and Real time electricity markets for ISOs, Bidding Evaluation for Gencos, future market clearing price, location evaluation for new generators and their impact on the inter-regional power transfers, Power Trading and Marketing, Energy Risk Management, ISO and Power Exchange operations, Transmission Reservation and OASIS application, NERC E-Tagging system, Transaction Scheduling system, Imbalance Energy application, Transmission Congestion Management and Pricing.
- **Base Power Applications**: AGC, economic dispatch, reserve monitoring
- **Transmission Network Applications**: power flow, optimal power flow, reactive power optimization, transmission impact studies for new generation and re-powering, real-time network modeling, state estimator, contingency analysis

- **Generation Scheduling Applications**: Unit Commitment, Load Forecast, Hydro-Thermal Coordination, Transmission Security Constrained and Co-optimization of energy and AS services.
- **System Analysis**: transient Analysis, short circuit current calculations

Technology

- **Software, Tools & Languages**: Oracle Developer 2000+ including Oracle Forms, Reports and Graphics; Oracle Discoverer, Oracle Express, Oracle Designer, Data warehouse AppsBuilder, Matlab, Mathcad, Fortran 90, Pro*Fortran, C, Pro*C, C++, PL/SQL, JAVA, Oracle Jdeveloper, DHTML
- **Database Experience:** Oracle Database Administration for Oracle 7.x, Oracle 8i, Develop Database Applications with JAVA, MS SQL 2000.
- **Operating Systems**: VAX/VMS, UNIX, Windows NT, 2000, XP.
- **Oracle Application Server**: Develop Database applications with JAVA, Develop Web-based Applications with JAVA
- **System Architecture Design:** Client/Server, Network Computing, Message Oriented Middleware (MOM) Technology and Oracle Advanced Queuing

ACADEMIC ACHIEVEMENTS

Ph.D. in Electrical Engineering, Illinois Institute of Technology, Chicago, Illinois, December 1993
Thesis:***Application of Fuzzy Sets to Power Systems Operation and Planning***

M.Sc. in Electrical Engineering, Kuwait University, Kuwait, June 1990
Thesis:***Abnormal Transients in Power Transformers***

B.Sc. in Electrical and Computer Engineering, Kuwait University, Kuwait, June 1986
Project: ***Series Compensation of Overhead Transmission Lines.***

Adjunct Professor, (Jan 1999 – June 2002)
Electrical and Computer Engineering Department at Illinois Institute of Technology (**IIT**), Chicago, IL:

- Teaching courses on electric utility restructuring and the challenges of power systems operation and planning in the new deregulation marketplace.

Teaching Experience:
Taught the following courses at Illinois Institute of Technology (**IIT**), Chicago, IL:

- Electric Machinery (ECE Undergraduate course at IIT, 1994,1999)
- Advanced Methods in Power Systems (ECE Graduate & Undergraduate course at IIT, 1999)
- Deregulation of the Electric Utility Industry (ECE Graduate course at IIT, 2000)
- Power Systems Planning in Regulated and Deregulated Environment (ECE Graduate course at IIT, 2001)

PUBLICATIONS

Refereed Journals:

- "A Fuzzy-Based Optimal Reactive Power Control," ***IEEE Transactions on Power Systems***, Vol. 8, No. 2, pp. 662-670, May 1993 (*principal author*)
- "Reactive Power Optimization Using Fuzzy Load Representation," ***IEEE Transactions on Power Systems***, Vol. 9, No. 2, pp. 898-905, May 1994 (*principal author*)
- "Application of Fuzzy Sets to Optimal Reactive Power Planning with Security Constraints," in **Proceedings of the IEEE 1993 Power Industry Computer Application (PICA)** Conference, pp. 124-130, Scottsdale, AZ, May 1993, Also in the ***IEEE Transactions on Power Systems***, Vol. 9, No. 2, pp. 589-597, May 1994 (*principal author*)
- "Static Security in Power System Operation with Fuzzy Real Load Conditions," ***IEEE Transactions on Power Systems***, Vol. 10, No, 1, pp. 77-87, Feb. 1995 (*principal author*)
- "AI Approach to Optimal Var Control with Fuzzy Reactive Loads," ***IEEE Transactions on Power Systems***, Vol. 10, No. 1, pp. 88-97, Feb. 1995 (*principal author*)
- "Effect of EMF on Minimum Cost Power Transmission," in Proceedings of the IEEE Transmission & Distribution (**T&D**) Conference, pp. 627-633, Chicago, IL, April 1994, Also in the ***IEEE Transactions on Power Systems***, Vol. 10, No. 1, pp. 347-355, Feb. 1995 (*principal author*)
- "A Practical Resource Scheduling with OPF Constraints," in **Proceedings of the IEEE 1995 Power Industry Computer Applications (PICA)** Conference, pp. 92-97, Salt Lake City, Utah, May 1995, Also in the ***IEEE Transactions on Power Systems***, Vol. 11, No. 1, pp. 254-259, Feb. 1996 (*principal author*)
- "Spot Pricing of Capacities for Generation and Transmission of Reserve in an Extended Poolco Model," Accepted for Publications in the ***IEEE Transactions on Power Systems***, 1997 Winter Meeting (co-author)
- "Short Term Generation Scheduling in Photovoltaic-Utility Grid with Battery Storage", in **Proceedings of the IEEE 1997 Power Industry Computer Applications (PICA)** Conference, Columbus, OH, Also to appear in the ***IEEE Transactions on Power Systems*** (co-author)
- "Use of Simulators in Testing New Electricity Markets", in **IEEE PES 2009 Proceedings**, Calgary, Alberta, Canada (co-author)

Proceedings of Refereed Conferences:

- "Optimal Reactive Power Dispatch with Fuzzy Variables," in Proceedings of the **IEEE 1993 International Symposium on Circuits and Systems (ISCS)**, pp. 2188-2191, Chicago, IL, May 1993 (*principal author*)
- "Application of Artificial Intelligence to Optimal Var Control in Electric Power Systems," in **Proceedings of Expert System Applications for the Electric Power Industry Conference**, Phoenix, AZ, December 1993 (*principal author)*
- "On the Exact Computation of Some Typical Transient and Dynamic Phenomena in Power Networks Including Steel-Core Transformers," in **Proceedings of the IEEE Industrial & Commercial Power Systems Conference (ICPS)**, pp. 61-69, Irvine, CA, May 1994 (*principal author*)

- "Application of Distributed Computing for Resource Scheduling," in **Proceedings of the 1996 American Power Conference** (**APC**), pp. 1284-1289, Chicago, IL., April 1996 (*principal author*)

Others:

- "An Augmented Short Term Generation Scheduling in a Constrained Power Network", Presented in response to invitation from the **Advanced Operation Methods Subcommittee of the Power System Committee,** IEEE PES 1997 Winter Meeting, New York, NY, Feb. 1997 (*principal author*)

Research Projects Completed:

- Develop Energy and Ancillary Services Bidding Strategies for GENCOs in Deregulated Power Markets
- Data Warehouse and Decision Support Tools Requirement for the Operation of Independent System Operators (ISOs).
- Business Requirements for Transmission Providers in the Area of Transmission and Energy Scheduling
- API Development for the Integration of the Electric Power Research Institute (EPRI) Topology Processing Application to the Common Information Model (CIM) based Oracle Database.
- Detailed Functional Requirements for Energy Trading in USA and EMEA.
- Price Based Unit Commitment with generation and demand bids
- Effect of Generation and Transmission of Reserve on Spot Prices
- Unit commitment in a Distributed Environment
- Incorporation of the Network Constraints in Unit Commitment
- Unit Commitment Study With Ramping Constraints for Common Wealth Edison Company (ComEd)
- Optimal Power Flow With Electro-Magnetic Fields Constraints
- Application of Fuzzy Sets to Power Systems Operation and Planning
- Applications of Neural Networks and Expert Systems to Optimal VAR Control with Fuzzy Reactive Loads
- Abnormal Transients in Power Transformers

Seminars Attended:

- IEEE 1993 International Symposium on Circuits and Systems (ISCS), Chicago, IL, May 1993
- IEEE/PES Winter Meeting, New York, New York, Jan/Feb 1994
- IEEE Transmission & Distribution (T&D) Conference, Chicago, IL, April, 1994
- American Power Conference (APC), Chicago, IL, April 1996
- IEEE Advanced Operation Methods Subcommittee Meeting, IEEE/PES 1997 Winter Meeting, New York, NY, Feb. 1997
- IEEE 1997 PICA Conference, Columbus, OH, 1997
- IEEE 1999 PICA Conference, Santa Clara, CA, May 1999
- NERC TagMart Conference, Dallas, TX, Feb 1999
- EPRI CCAPI Workshop, Las Vegas, NV, Mar 1999

- EPRI CCAPI Workshop, San Francisco, CA, June 1999
- NERC Common Power System Modeling III Meeting, Chicago, IL., Oct 1999
- Power Marketing 2000 Conference, Arlington, VA, Nov 1999
- Johnson Control Company Meeting, Milwaukee, WI, Dec 1999
- ISO's CIO Council Meeting, Indianapolis, IN, May 2000
- Congestion Forecasting & Pricing Conference, Chicago, IL, Jun 2000

Participation in Thesis Committees:

- Ph.D. Thesis Committee, "Transmission and Generation Maintenance Scheduling with Different Time Scales in Power Systems" by M.K.C. Marwali, Illinois Institute of Technology, Chicago, IL 1998.
- Ph.D. Thesis Committee, "Decomposition Approach to Unit Commitment with Reactive Power Constraints" by H. Ma, Illinois Institute of Technology, Chicago, IL 1999.

Appendix 2 to Declaration of Khaled Abdul-Rahman

Convergence Bidding Amendment

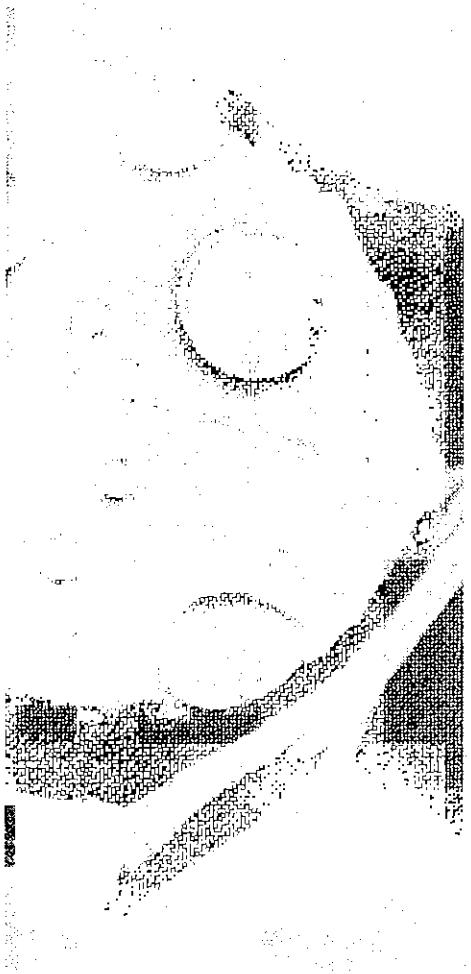
ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

California ISO
Your Link to Power

Market Performance and Planning Forum



March 16, 2010

Convergence Bidding – Aggregation

- The ISO will size the software to handle 30,000 bids and 700,000 bid segments in Day-Ahead Market run
  - A bid is an SC for a location for supply/demand type for a day
  - A bid segment is defined as a price/MW pair for an hour
  - Smallest convergence bid segment is 1 MW
- The ISO will aggregate bid segments at a single location across multiple SC to create a composite bid curve for use in the optimization
- Following the determination of cleared quantities at each location, awards based on the composite bid curve will be disaggregated and assigned back to the correct SC

Convergence Bidding – Aggregation

- Example – Three SCs submit Virtual Supply bids at the same node
  - SC1 submits: (0,$25), (25,$32), (50,$35), (75,$37), (100, $37)
  - SC2 submits: (0,$35), (50,$45), (100,$45)
  - SC3 submits: (0,$30), (10,$35), (20, $45), (30,$47), (40,$47)
- The market program will combine these three bids into:
  - (0,$25), (25,$30), (35,$32), (60,$35), (145,$37), (170,$45), (230,$47), (240, $47)
  - This bid curve will be used in the IFM representing the total virtual supply to be considered at the submitted bid location

Convergence Bidding – Disaggregation

- Assume the IFM cleared at $35 at this node for 130MW
  - Any bid segments under $35 will clear
  - Since more than one participant submitted a $35 segment, and that segment is marginal, the MW at $35 will be awarded pro-rata among the participants
- Allocation of Marginal Segment
  - SC1 would receive 29.4% (i.e. 25 MW / 85 MW) of the pro-rata portion
  - SC2 would receive 58.8% (i.e. 50 MW / 85 MW) of the pro-rata portion
  - SC3 would receive11.8% (i.e. 10 MW / 85 MW) of the pro-rata portion
- Final CB awards at the selected node:
  - SC1: 50 MW + (0.294 * 70 MW) = 70.58 MW
  - SC2: (0.588 * 70 MW) = 41.16 MW
  - SC3: 10 MW + (0.118 * 70 MW) = 18.26 MW

Appendix 3 to Declaration of Khaled Abdul-Rahman

Convergence Bidding Amendment

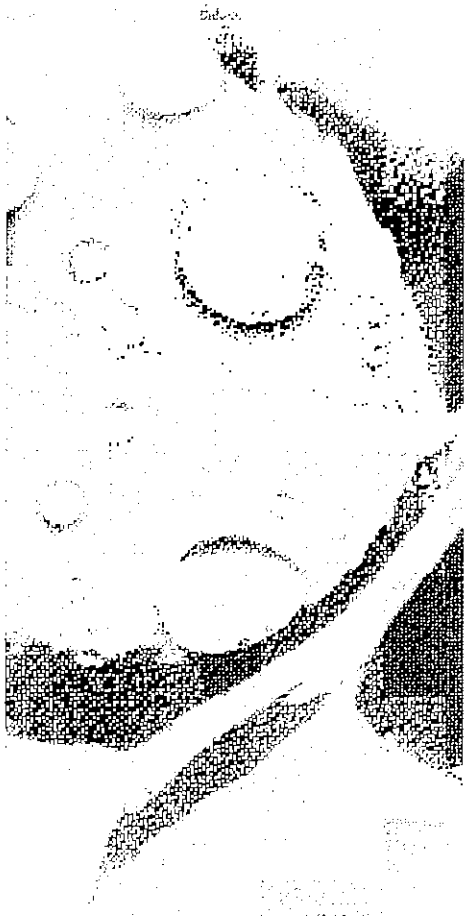
ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

California ISO
Your Link to Power

Market Performance and Planning Forum



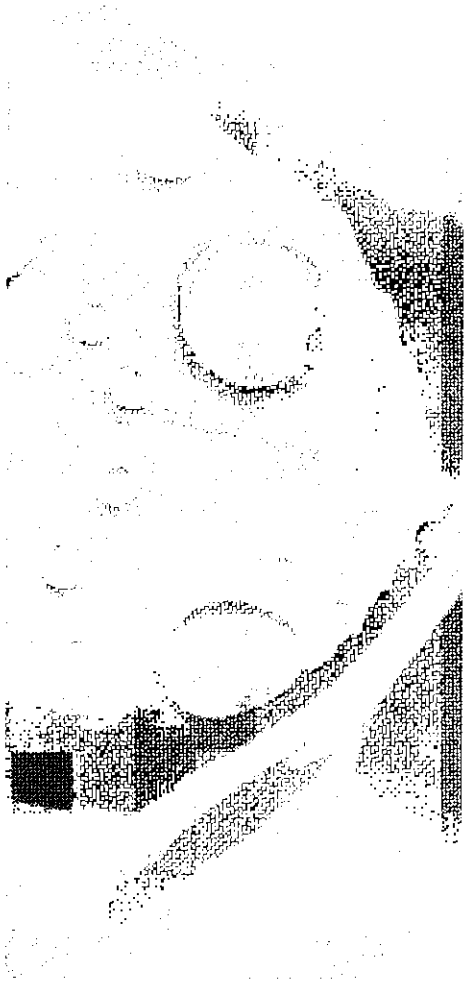
March 16, 2010

Convergence Bidding – AC Solution

- When an AC Solution cannot otherwise be reached, a nodal/group of nodes constraint will be enforced
  - MW limit is defined for each node based on the physical characteristics of the generation unit at that node (for gen busses) or the load forecast (for load busses)
  - MW Limit = Physical MW * (1+%delta)
- A percent violation is calculated for each bus at which CB occurs
  - %Violation = [abs(Net MW) – Limit] * 100/Limit on nodes that have CB
  - A list of the biggest %Violation is automatically generated
  - Nodes with physical bids only will not appear in the violation list
- A nodal MW constraint is imposed
  - A nodal constraint is automatically applied to a configurable subset of the %Violation list if a DC solution is passed back to UC from a given NA run
  - Both physical and virtual bids are subject to this constraint once it is imposed
- A DC solution is still a possibility

California ISO
Your Link to Power

Market Performance and Planning Forum



April 27, 2010

Convergence Bidding – AC Solution (follow up technical clarification from Tariff meeting)

- When an AC Solution cannot otherwise be reached, a nodal/group of nodes constraint will be enforced
  - MW limit is defined for each node based on the physical characteristics of the generation unit at that node (for gen busses) or the load forecast (for load busses)
  - MW Limit = Physical MW * (1+%delta)
- A percent violation is calculated for each bus at which CB occurs
  - %Violation = [abs(Net MW) – Limit] * 100/Limit on nodes that have CB
  - A list of the biggest %Violation is automatically generated
  - Nodes with physical bids only will not appear in the violation list
- A nodal MW constraint is imposed
  - A nodal constraint is automatically applied to a configurable subset of the %Violation list if a DC solution is passed back to UC from a given NA run
  - Both physical and virtual bids are subject to this constraint once it is imposed
- A DC solution is still a possibility

Attachment D – Declaration of Margaret Miller

Convergence Bidding Amendment

ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	**)**	**Docket No. ER10-___-000**

DECLARATION OF MARGARET MILLER ON BEHALF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

I. Introduction

Q. Please state your name and business address.

A. My name is Margaret Miller. My business address is 151 Blue Ravine Road, Folsom, California 95630.

Q. By whom and in what capacity are you employed?

A. I am employed as Manager, Market Design and Regulatory Policy for the California Independent System Operator Corporation ("ISO").

Q. Please describe your professional and educational background.

A. I have worked in the electric power system industry for over ten years. Between 1997 and 1999, I was a Client Relations Representative for the ISO. From 1999 to 2000, I served as a Portfolio Analyst for PG&E Energy Services. I was a Product Consultant for Silicon Energy Software from 2000 to 2002. In 2003, I returned to the ISO as Lead Engineering Specialist, in which position I served as a subject matter expert for the ISO's market redesign and technology upgrade project. I began in my current position in 2007. I received a Bachelor of Arts

degree from the University of California, Santa Barbara in 1990 and a Master of Business Administration degree from the University of San Francisco in 2002.

Q. What is the purpose of your declaration in this proceeding?

A. I will address two topics in my declaration. First I will provide support for the ISO's position limit proposal. As I will discuss, it is appropriate for the ISO to apply position limits at both internal nodes and the interties. Further, I will explain that the ISO has proposed a reasonable phased implementation period for position limits at internal nodes, and that it is reasonable for the ISO to implement more stringent position limits at the interties that will be phased out over a somewhat longer period. The second topic I will discuss is the ISO's proposed methodology for allocating cost uplifts. I will explain the principles behind the cost uplift allocation methodology and why the cost uplift allocation methodology is appropriate.

II. <u>The Application of Position Limits at Internal Nodes and Interties</u>

Q. Please explain the ISO's proposal to apply position limits at internal nodes and interties.

A. The ISO plans to apply position limits on the megawatt volume of virtual bids that any one scheduling coordinator can submit at an individual node or intertie, in order to address the potential exercise of market power or other adverse market outcomes during the initial implementation of convergence bidding. The ISO proposes that one set of position limits will apply at internal nodes based on periodically increasing percentages of the PMaxes of physical supply resources

and forecasts of the maximum MW consumption of physical demand resources at the internal nodes. The ISO proposes that a different set of position limits will apply at the interties based on more stringent (*i.e.*, smaller) periodically increasing percentages of the operating transfer capabilities at the interties. In its November 2009 convergence bidding design filing, the ISO proposed a two-year phased implementation period for position limits at internal nodes and a three-year phased implementation period for position limits at the interties. The ISO has significantly reduced the proposed phase-out periods for position limits based on direction from the Federal Energy Regulatory Commission ("Commission"). As I discuss below, the ISO now proposes to cut each of those phased implementation periods in half.

Q. Why does the ISO continue to believe that position limits are justified during the implementation of convergence bidding?

A. There are several reasons why position limits are appropriate. The first reason is that the ISO requires a transitional "safety net," in addition to other features of the ISO market design that the ISO plans to use to detect and address the potential exercise of market power through convergence bidding. These other design features include the ISO's existing local market power mitigation procedures, the ISO's proposed congestion revenue right ("CRR") settlement rule, administrative fees applied to each submitted virtual bid or cleared virtual bid, tracking of market outcomes and responsive measures taken by the ISO's market monitoring units, ISO authority to suspend convergence bidding, the ISO's fee structure, the ISO's

credit requirements, and convergence bidding uplift costs. Even with these other design features, it is still appropriate to also use position limits as a transitional safety net.

Q. Why is that?

A. The introduction of a major new market design feature like convergence bidding frequently raises the possibility of unforeseen and unintended market outcomes. Therefore, it is prudent to employ position limits during the transition period while a more mature and liquid convergence bidding market develops and market participants and the ISO gains experience with the actual operation of the convergence bidding market. The ISO expects the convergence bidding market to mature quickly especially since convergence bidding has been active in the markets of other independent system operators and regional transmission organizations for a number of years. However, during the early stages of convergence bidding, the position limits will operate to ensure that no single market participant can exercise market power at an individual node and to prevent distorted market outcomes, thus protecting customers.

Q. What other reasons justify the use of position limits during the implementation of convergence bidding?

A. The ISO's concerns about the potential for a new element of the market to create opportunities for market manipulation and adverse market outcomes are heightened by the experience of the ISO and its market participants during the

Western energy crisis of 2000-2001. During that time, California and other portions of the West experienced substantial market power issues and unanticipated market outcomes. The need to avoid any outcomes comparable to the Western energy crisis was a primary consideration for many parties participating in the ISO's convergence bidding stakeholder process. Given this historical context, the use of position limits in California as a transitional safety net is especially appropriate.

Q. Please provide other reasons supporting the use of position limits

A. By limiting the megawatt volume of virtual bids that any one scheduling coordinator can submit at an individual node or intertie, the position limits will reduce the harmful effect that any single market participant can have on the entire market. This will serve to prevent a variety of potentially manipulative behaviors. For example, the position limits will limit the ability of market participants to use virtual transactions to undermine the ISO's local market power mitigation measures, create infeasible schedules, or impact congestion for the purpose of gaming CRRs. Therefore, the safety net created by the position limits will help to prevent various issues from arising.

In addition, the use of position limits is supported by the ISO's Market Surveillance Committee and also the ISO's Department of Market Monitoring. The fact that both of the ISO's market monitors support position limits strongly suggests that it is prudent for the ISO to adopt them.

Q. Please describe the ISO's revised proposal for phasing out position limits.

A. The ISO proposes that the position limits at internal nodes will automatically be phased out over the course of one year and the position limits at the interties will automatically be phased out over a year and a half unless market outcomes warrant the position limits to remain in place longer. In that case the ISO would file with the Commission to extend the position limits for a longer period of time. As I have mentioned, the duration of these position limits is one-half of the duration the ISO proposed in its November 2009 convergence bidding design filing.

Q. Why are these phase-out periods appropriate?

A. In order to assess market behavior under convergence bidding and to ensure that the new market feature does not create unanticipated opportunities for market manipulation, the ISO needs a significant amount of data regarding the operation of the convergence bidding market feature. A year's worth of data will constitute a significant amount for the internal nodes, In addition, as I discuss later, the interties present certain additional issues and concerns that internal nodes do not. Therefore, the ISO believes it is appropriate to provide more time to evaluate market data for the interties.

Q. Would a four-month phase-out period be appropriate?

A. No. The ISO believes that position limits must remain in effect for longer than four months if they are to serve their intended purpose. The ISO will not have a significant amount of data to evaluate the potential market impacts of convergence bidding after only four months of operation of the convergence bidding market. Moreover, because the ISO plans to implement convergence bidding on February 1, 2011, a four-month implementation period for position limits would expire on June 1, 2011, which would be near the start of the first summer season of convergence bidding, when potential adverse market impacts associated with convergence bidding could affect the ability of the ISO to rely upon market mechanisms to satisfy peak load. The ISO would have substantial concerns about the elimination of position limits prior to or during the first summer of convergence bidding implementation.

Q. Please explain why the ISO proposes to apply more stringent position limits at the interties than at internal nodes.

A. More stringent position limits at the interties are appropriate for a number of reasons. First, the values of the operating transfer capabilities at the interties are usually significantly larger than the values of the PMaxes of physical supply resources and forecasts of the maximum MW consumption of physical demand resources at the internal nodes. Even with the smaller percentage position limits in place at the interties, a market participant can still take a sizeable position at many of the scheduling points due to the higher MW limit. This means that the smaller percentages and longer phase out is less onerous for market

participants. Given the large value of operating transfer capabilities at the interties, the ISO believes that the position limit "safety net" for the interties must be significantly tighter during the initial implementation of convergence bidding Taking that approach will narrow the gap between how much virtual transactions are reduced at the interties due to the application of position limits and how much virtual transactions are reduced at the internal nodes due to the application of position limits. Appropriately tailored position limits on the interties will allow the ISO to monitor the potential effect that excess volumes of virtual bids on the interties could have on reliability and the ISO's ability to rely on the interties for physical imports and exports during the initial period of convergence bidding implementation.

Q. What other reasons support using more stringent position limits at the interties?

A. Applying more stringent position limits at the interties is necessary for reliability purposes, because the interties present greater reliability concerns than do internal nodes. The ISO depends on imports at the interties to meet approximately 20 percent of the ISO's supply needs. When convergence bidding is implemented, virtual imports could potentially crowd out a significant amount of physical imports in the IFM – particularly non-resource adequacy imports – leaving the ISO short of normal import supplies and dependent on the HASP to fill the gap. Smaller position limits will allow the ISO to monitor the volumes and effects of virtual bidding on the interties and to mitigate these potential reliability

concerns. Moreover, the ISO's residual unit commitment ("RUC") process cannot be used to effectively address this issue, for two reasons.

Q. Please explain what those two reasons are.

A. First, as a capacity procurement mechanism, the RUC process does not procure energy (beyond the minimum load energy of generators it commits). Thus, when RUC procures imports, it essentially procures an obligation for those imports to bid energy into the HASP. But RUC does not reserve transmission capacity for those imports, and because it does not award them energy schedules, the import suppliers may not reserve external transmission to deliver energy to the ISO in order to respond to a HASP schedule. RUC was simply not designed to procure energy from imports if those imports do not clear the IFM. Second, the import supplies that currently can participate in RUC are those that provide resource adequacy capacity. Although the discussion above also applies to some extent to resource adequacy imports, an important distinction is that import suppliers of resource adequacy capacity are expected to manage their RUC participation obligations so as to ensure their ability to deliver in the HASP if they are given a RUC schedule. The ISO has explored options for opening up RUC participation to include non-resource adequacy imports, but for the reasons discussed above this change in itself may not be sufficient to guarantee the availability of non-resource adequacy imports in the HASP if they do not have an IFM energy schedule.

III. The ISO's Methodology for Allocating Cost Uplifts

Q. Please explain the basic principles behind the ISO's proposed methodology for allocating cost uplifts.

A. Under the current ISO tariff, net integrated forward market ("IFM") bid cost uplift and RUC compensation costs are each allocated in two tiers based on Commission-accepted cost causation principles. The ISO's proposed cost uplift allocation methodology is likewise based on the same cost causation principles, which require virtual bidders to be charged for costs they have caused to occur. Under these principles, virtual demand bids should be subject to uplift costs related to the increased unit commitment in the IFM caused by convergence bidding. Similarly, virtual supply bids should be subject to uplift costs related to the increased procurement within the RUC process in the day-ahead market caused by convergence bidding. Based on these considerations, the ISO has proposed to modify the existing cost uplift allocation provisions in the ISO tariff to include methodologies for allocating IFM bid cost uplift and RUC bid cost uplift through mathematical formulas that include netting of virtual supply and virtual demand, as well as threshold tests applicable to the IFM and RUC for determining the circumstances in which uplift costs will be allocated to virtual bids.

Q. Could you please explain further the rationale behind the netting of virtual supply and virtual demand under the cost uplift allocation proposal?

A. Certainly. The ISO developed its IFM and RUC cost uplift allocation proposals to provide symmetrical treatment of costs created by virtual bids as well as cost offsets created by virtual bids. Virtual demand has the effect of offsetting costs in RUC as a result of committing units in the IFM. Virtual supply, on the other hand, reduces commitment costs in the IFM but may cause the ISO to have to replace virtual supply with physical supply in RUC. Given the offsetting effects of virtual demand and virtual supply, it is the incremental effect of costs created between the IFM and RUC that represents the true cost. Thus, the net effect of virtual bids as a whole will determine where additional uplift costs may have been incurred in the market, not the gross effect of those virtual bids.

A market participant with a net virtual demand position in its portfolio is not contributing to additional costs in RUC and should not be subject to RUC cost uplift for tier 1, because the virtual demand offsets RUC costs by resulting in the commitment of additional units in the IFM. This reduces the need for the ISO to procure capacity in the RUC process. On the other hand, a market participant with a net virtual supply position in its portfolio should not be subject to IFM cost uplift for tier 1, as the market participant did not contribute to IFM costs. This proposed netting of virtual bids is similar to how the ISO applies netting to physical bids when determining the allocation of IFM and RUC tier 1 uplift costs under the current ISO tariff. Market participants are allocated IFM cost uplift for tier 1 based on the positive net of their scheduled demand minus self-scheduled generation and imports. Market participants are allocated RUC cost uplift for tier 1 based on their net

negative demand deviations, as it is those deviations that create the need for the ISO to procure RUC.

The ISO's netting proposal is also required for administrative feasibility. Pursuant to the ISO's existing market design, bid cost recovery is conducted on a system-wide basis, which is the same basis on which the ISO proposes to conduct netting of virtual bids. If the ISO were required to conduct netting on a more granular basis, it would have to redesign its entire bid cost recovery methodology to accommodate that greater granularity. Thus, such a redesign would have to increase the granularity of not only of virtual bids but also of physical bids. The ISO should not be required to overhaul the existing methodology when simply extending it to include netting of virtual bids on a system-wide basis is administratively feasible.

Q. Please explain further the rationale behind the threshold tests under the cost uplift allocation proposal.

A. The virtual market, if performing as expected, should result in a commitment of units in the day-ahead that is closer to real-time conditions than would otherwise exist without virtual bids. In the case of virtual demand, the most accurate way to measure that performance is to examine where the market cleared with virtual bids as compared with the level of supply needed to serve real-time demand. If there is a net positive virtual demand position that clears the IFM and the physical demand that clears the IFM plus net cleared virtual demand awards results in the market clearing above the level of supply needed to serve real-time demand, virtual demand

awards have contributed to additional unit commitment in the IFM and should therefore be allocated uplift costs for IFM tier 1. For virtual supply, if there is a net positive virtual supply position coming out of the IFM, then the ISO will need to procure RUC to make up for virtual supply that displaced physical supply in the IFM. In that case, it is reasonable to assess charges for RUC tier 1 uplift to market participants with a net virtual supply position in their bid portfolios.

The threshold tests are based on these core principles. Pursuant to the threshold tests, convergence bidding entities will be charged uplift costs only to the extent they result in additional costs beyond the costs that would have existed in the physical market absent those virtual bids. For example, the formula to apply IFM tier 1 uplift to virtual demand only applies charges to virtual demand if virtual demand resulted in the IFM clearing above what was needed to serve real-time load and in the case where the system-wide net of virtual awards that clear the IFM results in net positive virtual demand. Those charges are then allocated to market participants with a net virtual demand portfolio. If virtual demand contributed to the market clearing at or below the level needed to serve real-time load, these bids are not creating any additional costs and are contributing to the IFM clearing at an optimal level where the IFM would have cleared anyway if demand had been fully bid into the day-ahead market. The IFM is cleared to serve physical load, not virtual demand, and in that case any uplift costs would be allocated to physical demand. However, those costs would be no higher than would have existed without virtual demand in the market.

The formula to apply RUC tier 1 uplift costs to virtual supply first assesses whether or not there is a net positive virtual supply position on a system-wide basis in the market. If yes, the ISO will allocate RUC tier 1 uplift costs to market participants with a net positive virtual demand portfolio. On the other hand, if there is a net positive virtual demand position coming out of the IFM, then the ISO will not need to procure any additional capacity in RUC as a result of virtual supply displacing physical generation in the IFM. In that event, virtual supply did not contribute to any additional costs due to RUC procurement and should therefore not be assessed uplift charges.

Q. How will the ISO address the allocation of real-time uplift to virtual bids?

A. The ISO examined how virtual bids (specifically, virtual supply) will impact real-time uplift. The ISO determined that virtual supply could have an impact on real-time uplift by displacing physical supply at a location, thus requiring the ISO to replace the physical supply at that location in the RUC process. Because short start units are selected in RUC but are not committed until real-time, those costs are currently allocated as part of real-time uplift. In order to allocate these specific costs to both virtual supply and underscheduled load, we propose to move these uplift costs for short-start units from where they are currently allocated, which is through real-time uplift, to instead being allocated through RUC uplift tier 1. Since these units are ultimately committed due to a RUC decision, we believe it is appropriate allocate this portion of real-time uplift to net

virtual supply and underscheduled load through RUC uplift tier 1. Any additional real-time uplift costs will continue to be allocated to measured demand.

The allocation methodology I have described is specific to virtual bids. In a separate proceeding, the Commission has ordered the ISO to redesign its existing single-tier real-time uplift charge into two tiers within three years of start-up of the new ISO market, which would be in April 2012. The ISO will address that order through a separate stakeholder process.

Q. Does this conclude your declaration?

A. Yes.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge.

Executed on June 25, 2010.

Margaret Miller

Attachment E – Declaration of Eric Hildebrandt

Convergence Bidding Amendment

ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	**)**	**Docket No. ER10-___-000**

DECLARATION OF ERIC HILDEBRANDT ON BEHALF OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

I. Introduction

Q. Please state your name and business address.

A. My name is Eric Hildebrandt. My business address is 151 Blue Ravine Road, Folsom, California 95630.

Q. By whom and in what capacity are you employed?

A. I am employed as Director of the Department of Market Monitoring ("DMM") for the California Independent System Operator Corporation ("ISO").

Q. Please describe your professional and educational background.

A. I have over twenty years of experience in the electric utility industry, along with a Bachelor of Science degree in Political Economy from Colorado College and Master of Science and Doctor of Philosophy degrees in Energy Management and Policy from the University of Pennsylvania.

I began my career in the energy industry as a Research Associate at the Center for Energy and Environment at the University of Pennsylvania in 1988, and

worked for over six years as an economic consultant to the electric utility industry through the consulting firms of Xenergy Inc. and Hagler Bailly Consulting. I then worked for over three years at the Sacramento Municipal Utility District as Supervisor of Monitoring and Evaluation.

Since joining the ISO's Department of Market Monitoring in 1998, I have worked extensively on a wide range of issues involving analysis of market performance, behavior of market participants, and design of market rules that promote market efficiency and deter potential detrimental market behavior. During the western energy crisis of 2000-2001, I played a lead role in analyzing market conditions and behavior in California's wholesale energy markets and in developing market design options for addressing the wide range of problems occurring during this period. In the aftermath of the energy crisis, I worked extensively as the ISO's lead investigator on a wide range of investigations and other regulatory proceedings relating to the market behavior of individual market participants in California's wholesale energy markets. Subsequently, I have played a lead role in developing and implementing new ISO market rules to prevent or address detrimental market behavior in the future. I have also led the ISO's efforts to monitor and investigate potential non-compliance with market rules of the Federal Energy Regulatory Commission ("Commission") and the ISO, and to refer potential violations of these rules to the Commission's Office of Enforcement.

Q. What is the purpose of your declaration in this proceeding?

A. I will discuss the ISO's proposed authority to suspend or limit convergence bidding. As I will explain, the ISO proposes to implement that authority through clearly and objectively defined tariff provisions, and the ISO will provide market participants with the ability to consult with the ISO and explain why suspension may not be warranted.

II. ISO Authority to Suspend or Limit Convergence Bidding

Q. Please provide an overview of the ISO's proposed authority to suspend or limit convergence bidding.

A. The ISO proposes to implement that authority through tariff language in new Section 39.11.2 of its tariff. Under these provisions, the ISO may suspend or limit the ability of one or more scheduling coordinators to submit virtual bids on behalf of one or more convergence bidding entities for any of the reasons set forth in the tariff. Specifically, if the ISO determines that convergence bidding activities detrimentally affect system reliability or grid operations, cause or contribute to an unwarranted divergence in prices other than shadow prices, or cause or contribute to an unwarranted divergence in shadow prices, the ISO may suspend or limit convergence bidding, subject to a number of due process requirements set forth in the tariff.

Q. Please describe in more detail the circumstances in which convergence bidding activities cause or contribute to unwarranted divergence in prices other than shadow prices.

A. The ISO will determine whether convergence bidding activities cause or contribute to unwarranted divergence in prices in the day-ahead market and the hour-ahead scheduling process ("HASP") or real-time market, as applicable, using the following methodology:

(i) The ISO will calculate the average divergence between day-ahead prices and real-time prices for the ISO balancing authority area over a four-week period or such other period of time that the ISO determines to be appropriate.

(ii) The ISO will determine whether there are any Eligible PNodes and/or Eligible Aggregated PNodes at which: (A) the absolute value of the average divergence between day-ahead prices and real-time prices over that period of time or an appropriate subset of that period of time exceeded the system-wide average divergence in prices calculated pursuant to subsection (i), immediately above, by a percentage established by the ISO pursuant to the applicable Business Practice Manual and (B) the convergence bidding activities of one or more scheduling coordinators on behalf of one or more convergence bidding entities significantly contributed to this excess divergence.

Q. How do these tariff provisions clearly and objectively define the circumstances in which convergence bidding activities cause or contribute to unwarranted divergence in prices?

A. The tariff provisions set forth algorithms that define the situations in which an unwarranted divergence in prices may occur. These algorithms have been developed and refined by DMM after extensive input by stakeholders.

Q. Are these algorithms similar to those employed by any other regional transmission organization?

A. Yes. The algorithms are similar but not identical to tariff provisions authorizing the Midwest Independent Transmission System Operator, Inc. ("Midwest ISO") to suspend or limit convergence bidding by individual participants in the event of an unwarranted divergence in prices.

Q. What are the similarities and differences between the California ISO's proposed algorithms and the Midwest ISO's algorithms?

A. Like the Midwest ISO, the California ISO will calculate the average divergence between day-ahead and real-time prices over a four-week period or other appropriate time period. However, the Midwest ISO calculates whether convergence bidding activity caused an average hourly divergence of greater than ten percent or less than negative ten percent over the time period, whereas the California ISO will calculate whether convergence bidding activity significantly contributed to an average divergence over the time period in excess of the system-

wide average divergence by a percentage established in the applicable Business Practice Manual.

Q. Why does the ISO propose to use an approach that differ in some respects from that employed by the Midwest ISO?

A. It is appropriate for the ISO to employ this modified version of the Midwest ISO's approach. The ISO proposes that the trigger for its authority to suspend or limit convergence bidding will be a pattern over time of market participants significantly contributing to abnormal divergence between day-ahead and real-time prices. Defining the system-wide average divergence as "normal" divergence and using statistical measures to determine what constitutes a significant deviation from that norm is a reasonable means of identifying inappropriate divergence. These measures are based on the use of objective calculations. Moreover, it is appropriate for the ISO to set forth in the Business Practice Manual the percentage to be used in determining when significant divergence exists. In the initial period after convergence bidding is implemented, the ISO anticipates that variances in divergence may fluctuate fairly quickly and frequently. Therefore, including the percentage in the Business Practice Manual gives the ISO needed flexibility to adjust it based on actual market conditions.

Q. Does the ISO anticipate that it will need to adjust the percentage in the Business Practice Manual just as frequently after the initial period of convergence bidding implementation?

A. No. The ISO expects that there will be less need to adjust the percentage as the ISO collects more data on convergence bidding activity over time. Following the initial implementation of convergence bidding, the ISO expects that the percentage will need to be adjusted only rarely, if at all.

Q. Please describe in more detail the circumstances in which convergence bidding activities cause or contribute to unwarranted divergence in shadow prices.

A. The ISO will determine whether convergence bidding activities cause or contribute to an unwarranted divergence in shadow prices between the day-ahead market and the HASP or real-time market that contributes to a significant divergence in LMPs at any Eligible PNode and/or Eligible Aggregated PNode. The ISO will base each such determination on a calculation of the deviation between average hourly shadow prices in the day-ahead market and the HASP or real-time market, as applicable, during a rolling four-week period, or such other period that the ISO determines to be appropriate given the convergence bidding activity under review. If the ISO determines that convergence bidding activity has resulted in a deviation over that period between average hourly shadow prices in the day-ahead market and the HASP or real-time market that is greater than a percentage established by the ISO pursuant to the applicable Business Practice Manual and such divergence in shadow prices contributes to a significant divergence in LMPs at any Eligible PNode and/or Eligible Aggregated

PNode, the ISO will determine that convergence bidding causes or contributes to an unwarranted divergence in shadow prices.

Q. How do these tariff provisions define the circumstances in which convergence bidding activities cause or contribute to unwarranted divergence in shadow prices?

A. The tariff provisions combine elements of the Midwest ISO's approach and the California ISO's proposed approach regarding other types of prices, which I discuss above. The shadow price tariff provisions objectively define the circumstances in which they will apply.

Q. Will the ISO automatically suspend or limit the convergence bidding activity of market participants in any of the circumstances described above?

A. No. The proposed tariff provisions I have discussed give the ISO the authority, but not the obligation, to suspend or limit convergence bidding activity. In every case where suspension or limitation may be warranted, the ISO will perform further analysis (including conferring with the affected market participants, if practicable) prior to concluding that suspension or limitation is warranted, and will employ other procedures for consulting with affected virtual bidders.

Q. Could you provide more detail about the provisions of the ISO's proposal that require consultation with affected market participants?

A. Yes. The ISO's tariff provisions require that, whenever practicable, prior to suspending or limiting convergence bidding, the ISO will notify affected scheduling coordinators and affected convergence bidding entities that the ISO intends to suspend or limit convergence bidding and will confer and exchange information with the affected scheduling coordinators and affected convergence bidding entities in an effort to resolve any dispute as to whether suspension or limitation of convergence bidding is warranted. In cases where taking such actions prior to suspending or limiting convergence bidding is not practicable (*e.g.,* where the ISO must act expeditiously to address immediate adverse market outcomes), the ISO will promptly notify the affected scheduling coordinators and affected convergence bidding entities that the ISO has suspended or limited convergence bidding, and will promptly confer and exchange information with the affected scheduling coordinators and affected convergence bidding entities in an effort to resolve any dispute as to whether suspension or limitation of convergence bidding is warranted. Within two business days of the notice of suspension or limitation, the ISO will provide the affected scheduling coordinators and affected convergence bidding entities with information justifying the decision to suspend or limit convergence bidding.

Q. What other procedural protections does the ISO's proposed tariff language offer for market participants?

A. The proposed tariff revisions provide that the ISO will submit to the Commission supporting documentation, including any information provided to the ISO by the affected scheduling coordinators and affected convergence bidding entities, within

ten business days after any suspension or limitation of convergence bidding begins, unless the ISO concludes prior to the end of the ten business day period that the suspension or limitation of convergence bidding was or is not warranted. The ISO will provide the affected scheduling coordinators and affected convergence bidding entities with a copy of any supporting documentation submitted to the Commission.

Q. Does the ISO's filing specify how long a suspension or limitation of convergence bidding will last?

A. Yes. The tariff provisions state that suspension or limitation of convergence bidding by the ISO will remain in effect for ninety days after the ISO submits its initial supporting documentation to the Commission, unless the Commission directs otherwise or the ISO itself determines that the suspension or limitation of convergence bidding should continue for fewer than ninety days. After the ninety day period expires, the suspension or limitation of convergence bidding will remain in effect only if the Commission permits or requires it to remain in effect.

Q. Do the ISO's proposed tariff provisions maintain the confidentiality of information regarding the suspension or limitation of convergence bidding?

A. Yes. The ISO will maintain the confidentiality of the identities of the affected scheduling coordinators and affected convergence bidding entities until such time as the Commission concludes that the circumstances or the conduct of the affected scheduling coordinators and affected convergence bidding entities warranted suspension or limitation of convergence bidding.

Q. Will the ISO have the authority to discontinue a suspension or limitation of convergence bidding?

A. Yes. Under the ISO's proposed tariff revisions, the ISO will have the authority to discontinue the suspension or limitation of convergence bidding at any time it determines such suspension or limitation is no longer appropriate and will notify the Commission if such suspension or limitation of convergence bidding is discontinued after supporting information concerning such suspension or limitation has been submitted to the Commission.

Q. Does this conclude your declaration?

A. Yes

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct to the best of my knowledge.

Executed on June 24, 2010.

Eric Hildebrandt

Attachment F – Table Summarizing Key Dates in Stakeholder Process

Convergence Bidding Amendment

ER10-___-000

CAISO Fourth Replacement Tariff

June 25, 2010

Key Dates in Convergence Bidding Stakeholder Process

Materials provided by the ISO and stakeholders in the stakeholder process are available on the ISO's website at http://www.caiso.com/1807/1807996f7020.html.

Date	Event/Due Date
December 1, 2009	ISO issues "External Business Requirements Specification – Convergence Bidding, Version 0.1" for stakeholder review
December 21, 2009	ISO issues first draft of convergence bidding tariff language for stakeholder review
January 8, 2010	Due date for written stakeholder comments on first draft of convergence bidding tariff language issued on December 21, 2009
January 19, 2010	ISO hosts convergence bidding stakeholder meeting that includes discussion on draft tariff language and stakeholder comments
March 2, 2010	ISO hosts stakeholder conference call to discuss directives contained in February 18, 2010 Commission order on Convergence Bidding Design Filing and to provide new schedule for tariff language stakeholder process
March 24, 2010	ISO issues second draft of convergence bidding tariff language for stakeholder review
April 6, 2010	Due date for written stakeholder comments on second draft of convergence bidding tariff language issued on March 24, 2010
April 15, 2010	ISO issues updated second draft of convergence bidding tariff language for stakeholder review
April 19, 2010	ISO hosts convergence bidding stakeholder meeting that includes discussion on draft tariff language and stakeholder comments
April 19, 2010	ISO issues updated "External Business Requirements Specification – Convergence Bidding, Version 1.0" for stakeholder review
April 21, 2010	ISO issues "California ISO Convergence Bidding Project Implementation Plan – Version 1.0" for stakeholder review
April 23, 2010	ISO issues third draft of convergence bidding tariff language for stakeholder review
May 7, 2010	Due date for written stakeholder comments on third draft of convergence bidding tariff language issued on April 23, 2010
May 13, 2010	ISO issues fourth draft of convergence bidding tariff language for stakeholder review

Date	Event/Due Date
May 14, 2010	ISO hosts convergence bidding stakeholder conference call that includes discussion on draft tariff language and stakeholder comments
May 20, 2010	ISO issues revised "Addendum to the Draft Final Proposal for the Design of Convergence Bidding" to reflect corrections in bid cost recovery equations
June 22, 2010	ISO hosts convergence bidding stakeholder meeting that includes discussion on draft tariff language
June 25, 2010	ISO files tariff amendment to implement convergence bidding

CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing documents upon each of the entities listed in the documents as receiving service, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Washington, D.C. this 25th day of June, 2010.

Bradley R. Miliauskas

Bradley R. Miliauskas