California Independent
System Operator Corporation

November 23, 2016

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. ER17- ___-000

Tariff Amendment to Implement Administrative Pricing Policy and Tariff Clarifications

Dear Secretary Bose:

The California Independent System Operator Corporation ("CAISO") submits this tariff amendment to implement the administrative pricing policy, which was part of the CAISO's pricing enhancement initiative, and to clarify and update tariff provisions that apply to emergency operations.[1] The proposed tariff amendments generally stem from lessons learned following the September 2011 power outage in the southwestern United States.

Specifically, the CAISO proposes to revise CAISO tariff section 7.7 concerning application of administrative prices when market prices are not available for any reason. The proposed changes provide greater transparency and more appropriate pricing logic depending on the interval and how many intervals are missing, and whether the day-ahead market or the real-time market is involved. The CAISO also proposes to reorganize, streamline, and clarify tariff section 7.7 to improve the readability and logical flow of the emergency tariff provisions. Lastly, consistent with guidance provided in a prior Commission order, the CAISO proposes to clarify that in the event of an "uncontrollable force,"

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[1] The CAISO submits this filing pursuant to section 205 of the Federal Power Act, 16 U.S.C. § 824d.

a market participant is not held harmless from the financial consequences of binding market results.

These revisions are just and reasonable. They introduce more appropriate administrative prices, streamline, clarify, and improve the tariff, and address an earlier Commission directive to clarify the tariff provisions on uncontrollable force. The CAISO requests that the Commission accept the tariff revisions contained in this filing effective as of February 1, 2017.

I. Background

A. Overview of the CAISO Markets

The CAISO operates both day-ahead and real-time markets for energy and energy-related products and services.[2] As part of the real-time market, the CAISO conducts a fifteen minute market throughout the operating day and issues five-minute real-time dispatch instructions.[3] In normal circumstances, the day-ahead market produces hourly schedules and awards, and the real-time market produces fifteen-minute schedules and awards and five-minute dispatches. All of the outcomes of the CAISO's market produce prices.

B. Management of System Emergencies and Other Abnormal System Conditions Under Section 7.7 of the CAISO Tariff

The CAISO manages system emergencies and other abnormal system conditions affecting the markets it operates pursuant to section 7.7 of the CAISO tariff.[4] Existing tariff section 7.7.4 sets forth a process under which the CAISO may intervene in the operation of any of the CAISO markets and apply an administrative price if the CAISO determines that such intervention is necessary to prevent, contain, or correct a system emergency. The tariff defines the

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[2] *See* existing tariff sections 27, 31, and 34. For the sake of clarity, this transmittal letter distinguishes between existing tariff provisions (*i.e.*, provisions in the current CAISO tariff), new tariff provisions (*i.e.*, new provisions that the CAISO proposes to add to the tariff in this filing), and revised tariff provisions (*i.e.*, existing tariff provisions that the CAISO proposes to revise in this filing).

[3] *See* existing tariff section 34.4; tariff appendix A, existing definition of "Fifteen Minute Market."

[4] The tariff defines a "system emergency" as conditions beyond the normal control of the CAISO that affect the ability of the CAISO balancing authority area to function normally, including any abnormal system condition that requires immediate or automatic action to prevent loss of load, equipment damage, or tripping of system elements that may result in cascading outages or to restore system operation to meet applicable reliability criteria. Tariff appendix A, existing definition of "System Emergency."

administrative price as the price set by the CAISO in place of a locational marginal price when, by reason of a system emergency, the CAISO determines that it no longer has the ability to maintain reliable operation of the CAISO controlled grid relying solely on the economic dispatch of generation. Tariff section 7.7.4 sets the administrative price for each of the markets at the applicable price from the settlement period immediately preceding the missing settlement period in which the intervention took place.[5]

Pursuant to existing tariff section 7.7.15.1(f), the CAISO may also use administrative pricing if a market disruption occurs, to prevent a market disruption, or to minimize the extent of a market disruption. The tariff defines a market disruption as an action or event that causes a failure of a CAISO market, related to system operation issues or system emergencies referred to in existing tariff sections 7.6 (which concerns normal system operations) or 7.7, respectively.[6] Although market disruptions occur with some frequency, they are generally of short duration, *i.e.*, limited to a few five-minute intervals or, in the case of a planned disruption to take actions such as implementing a software patch or performing software maintenance, an hour or two. In contrast, full market suspension has occurred only once – during the September 2011 power outage in the southwestern United States.

During the September 2011 outage, the CAISO relied on these emergency tariff provisions, which proved to be difficult to interpret and apply. For example, CAISO operators erroneously concluded they had tariff authority to set the administrative price and then set a price much higher than the tariff-defined administrative price. This price, in turn, adversely affected market participants with financially binding day-ahead schedules. As discussed in greater detail below, the CAISO filed a tariff waiver request concerning the administrative price, which included financial relief.

Other subsections in existing tariff section 7.7 address matters related to managing system emergencies and other abnormal system conditions, including CAISO notifications of system conditions, emergency guidelines, periodic tests of emergency procedures, under-frequency load shedding, use of load curtailment programs, system emergency reports and sanctions, and CAISO facilities and equipment. These tariff provisions have proven difficult to interpret and apply due to redundancies and unnecessary provisions. For example, in addition to using the term “market disruption” as described above, the tariff also includes the term “market interruption,” defined as actions taken by the CAISO outside of the

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[5] Existing tariff section 7.7.4(3); tariff appendix A, existing definition of “Administrative Price.”

[6] Tariff appendix A, existing definition of “Market Disruption.”

normal market operation of any of the CAISO markets in the event of a market disruption, to prevent a market disruption, or to minimize the extent of a market disruption as provided in tariff sections 7.7.15 and 34.9.[7]

C. Commission Orders and the Stakeholder Process for this Filing

As noted above, following the September 2011 power outage in the southwestern United States, the CAISO filed a petition for waiver of certain tariff provisions to the extent the Commission found that the CAISO had acted beyond its tariff authority in settling administrative prices and the real-time market in response to the outage. The CAISO also explained in the tariff waiver petition that, regardless of whether the Commission concluded that the CAISO's response to the system emergency was consistent with the tariff, the tariff provisions regarding the CAISO's emergency authority and the settlement implications of such authority in the event a system emergency required clarification or revision. Therefore, the CAISO stated its intention to convene a stakeholder process to clarify or revise the tariff provisions within 30 days after the Commission issued an order addressing the tariff waiver petition.[8]

In June 2012, the Commission issued an order granting the CAISO's tariff waiver petition and accepting the CAISO's commitment to convene a stakeholder process.[9] The CAISO began the stakeholder process, which it initially called the administrative pricing rules initiative, the following month. The CAISO subsequently paused that stakeholder process, however, to address more time-sensitive matters. At the CAISO's May 22, 2014 Market Performance and Planning Forum, the CAISO announced that it would resume the stakeholder initiative as part of its new pricing enhancements initiative to enhance market outcomes and provide more accurate and appropriate price signals in the CAISO markets.[10] The CAISO intended the resumed initiative to address administrative pricing rules, emergency tariff authority, and force majeure.[11]

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[7] Tariff appendix A, existing definition of "Market Interruption." Tariff section 34.9 concerns the use of energy bids.

[8] CAISO petition for waiver of tariff provisions, Docket No. ER12-205-000, at 21 (Oct. 26, 2011).

[9] *See Cal. Indep. Sys. Operator Corp.*, 139 FERC ¶ 61,207, at P 77 and Ordering Paragraphs (A)-(C) (2012).

[10] *See* CAISO presentation, Market Performance and Planning Forum, at slide 48 (May 22, 2014).

[11] *See* Pricing Enhancements, Issue Paper and Straw Proposal, July 1, 2014. In addition to addressing those matters, the CAISO added three other topics: (1) revisions to the validation process for self-schedules supported by existing transmission contracts

In an October 24, 2014 order denying a complaint filed by Powerex Corp. ("Powerex"), the Commission provided guidance regarding the pricing enhancements stakeholder process.[12] The Commission noted that there appeared to be confusion among stakeholders as to the applicability of the uncontrollable force provisions set forth in tariff section 14.1, which state that neither the CAISO nor a market participant will be considered in default of any obligation under the tariff if prevented from fulfilling that obligation due to the occurrence of an uncontrollable force. The Commission stated that it was important that the pricing enhancements stakeholder process resolve the interplay between the uncontrollable force provisions and the CAISO's settlement rules.[13] Subsequently, the CAISO expanded consideration of this issue in light of the Commission's comments.[14]

The pricing enhancements stakeholder initiative included several opportunities for stakeholder involvement:

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and transmission ownership rights to avoid creating artificial congestion and to ensure efficient use of the CAISO-controlled transmission grid; (2) modifications to the mathematical formulation the CAISO's market software uses for pricing the relaxation of transmission constraints to eliminate the current potential compounding effect of multiple contingencies on the price for relaxing transmission constraints; and (3) revisions to the CAISO's market solution formulation to eliminate conditions that can lead to multiple pricing solutions for the same problem, ensuring that the market application produces a unique price if a market clearing problem is limited by any constraint that affects the energy prices. The CAISO has already filed and received Commission acceptance of tariff amendments addressing these three topics. *See Cal. Indep. Sys. Operator Corp.*, 152 FERC ¶ 61,195 (2015); *Cal. Indep. Sys. Operator Corp.*, 156 FERC ¶ 61,152 (2016).

[12] *Powerex Corp. v. Cal. Indep. Sys. Operator Corp.*, 149 FERC ¶ 61,065 (2014) ("October 2014 Order"). The complaint alleged that the CAISO had assessed unjust and unreasonable imbalance energy charges because the CAISO had determined that an August 18, 2013 fire that prevented Powerex from providing its scheduled day-ahead energy did not prevent Powerex from fulfilling its tariff commitments so as to trigger the force majeure provisions of the tariff.

[13] *Id.* at P 31. Further, the Commission directed the CAISO to file an informational report regarding the status of the stakeholder process if that process was not concluded by July 31, 2015. *Id.* On July 27, 2015, the CAISO filed an informational report explaining that the policy-development portion of the stakeholder process was completed and that the CAISO and stakeholders were developing the tariff revisions needed to implement the policy. CAISO informational report, Docket No. EL14-59-000, at 2-4 (July 27, 2015).

[14] *See* Final Proposal, October 30, 2014, which is also included as attachment D to this filing.

- The CAISO issued three papers;
- The CAISO held stakeholder conference calls to discuss the CAISO papers and provided opportunities for stakeholders to submit comments on the papers;
- The CAISO developed draft tariff provisions; and
- The CAISO held additional conference calls and provided opportunities to stakeholders to submit written comments on the draft tariff provisions.[15]

The CAISO Governing Board ("Board") voted unanimously to authorize this filing during its public meeting held on December 18, 2014.[16]

II. Proposed Tariff Revisions

A. Enhancements to Administrative Pricing Provisions

1. Definition of Administrative Price

The CAISO proposes to revise the definition of the term "administrative price" so that it means the market results determined according to new tariff section 7.7.9.[17] As discussed below, tariff section 7.7.9 sets forth a methodology for determining market results to arrive at the administrative price.

2. Tariff Section 7.7.9 – Application of Administrative Prices and Use of Prior Market Results

The CAISO proposes to add new tariff section 7.7.9 to set forth how it will determine prior market results to arrive at administrative prices for the day-ahead market or real-time market to manage an imminent or actual system emergency or to prevent, manage, or minimize the extent of a market disruption.[18] New

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[15] Additional materials regarding this stakeholder process are available on the CAISO website on the Pricing Enhancements page. A list of key dates in the stakeholder process is provided in attachment F to this filing.

[16] Board Materials related to this authorization are available on the CAISO website. These materials include a memorandum to the Board on the pricing enhancements proposal from Mark Rothleder, Vice President, Market Quality & Renewable Integration ("Board Memorandum"), which is also provided in attachment E to this filing.

[17] Tariff appendix A, revised definition of "Administrative Price."

[18] New tariff section 7.7.9(a).

section 7.7.9 not only establishes rules for the administrative prices, but it also clarifies the tariff by separating the sections regarding determination of the administrative price from those sections authorizing the CAISO to set it. For example, existing section 7.7.4 authorizes the CAISO to apply an administrative price in response to a system emergency and specifies that price, but neither existing section 7.7.15, which allows the CAISO to use administrative prices to address a market disruption, nor the existing definition of an administrative price, refers to section 7.7.4.

The table below summarizes how administrative prices for energy will be applied in the day-ahead market and the real-time market pursuant to section 7.7.9.

Market	Proposed Administrative Pricing Rules
Day-ahead market	Use the day-ahead market results from the previous day (except for virtual awards) if they will produce a reasonable profile of schedules to meet real-time needs; if the market results will not meet real-time needs, rely instead on manual instructions and on real-time market results (except with regard to congestion revenue rights).[19]
Real-time market not suspended	If market results are unavailable for fewer than four consecutive 15-minute FMM intervals, use the FMM market results for the immediately preceding FMM interval(s); if market results are unavailable for fewer than 12 consecutive 5-minute dispatch intervals, use the RTD market results for the immediately preceding dispatch interval(s).[20] If market results are unavailable for at least four consecutive 15-minute FMM intervals and are available for the RTD during those FMM intervals, use the average of RTD market results during each such FMM interval and use the market results from the prior intervals as needed; if market results are unavailable for at least 12 consecutive 5-minute dispatch intervals and are available for the FMM during those dispatch intervals, use the FMM market results from the applicable FMM during the dispatch intervals.[21] If market results are unavailable for at least four consecutive 15-minute FMM intervals and are unavailable for the RTD during those FMM intervals, use the

19 New tariff sections 7.7.9(b)(1)(A)-(B).

20 New tariff sections 7.7.9(c)(1)-(2).

21 New tariff sections 7.7.9(c)(3)-(4).

Market	Proposed Administrative Pricing Rules
	day-ahead market results for the corresponding trading hour; if market results are unavailable for at least 12 consecutive 5-minute dispatch intervals and are unavailable for the FMM during those dispatch intervals, use the previous day's day-ahead market results for the corresponding trading hour.[22]
Real-time market suspended	Use the previous day's day-ahead market results for the corresponding trading hour.[23]
Default provision	In any circumstance not described above, use market results from the most recent preceding applicable interval that produced acceptable market results.[24]

The following sections of this transmittal letter describe in more detail the proposed means of applying administrative prices in the day-ahead and real-time markets.

a. Day-Ahead Market

In the case of a suspension of the day-ahead market, the CAISO will use the market results for the previous day's day-ahead market (except for virtual awards), as applicable, for the day-ahead market if the CAISO determines, based on expected system conditions, that using such market results will provide a reasonable profile of schedules to meet the needs of the real-time.[25] If, however, the CAISO determines that using those day-ahead market results will not reasonably meet the needs of the real-time, the CAISO may rely on real-time market results and on manual actions such as exceptional dispatches, as applicable, for pricing and settlement purposes, except that the CAISO will settle congestion revenue rights using the hourly average of the 15-minute prices in the fifteen minute market for each hour of the real-time market.[26]

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22 New tariff section 7.7.9(c)(5)-(6).

23 New tariff section 7.7.9(d).

24 New tariff sections 7.7.9(e).

25 New tariff section 7.7.9(b)(1)(A).

26 New tariff section 7.7.9(b)(1)(B). Because virtual bids are cleared within the day-ahead market, no virtual bids (or physical bids) will clear in the event of a suspension of the day-ahead market, and thus virtual awards will be zero. Different consequences will follow for virtual bids depending on which of the two alternative determinations the CAISO makes. If the CAISO decides to use the day-ahead market results from the previous day for the day-ahead market, it will suspend any virtual bids for that day and

If the CAISO has not published the day-ahead market results or determines it may suspend the day-ahead market, it will notify market participants by 6:00 p.m., indicating whether the CAISO anticipates it will: (i) publish the market results for the day-ahead market, and if so, when; (ii) use the previous day's market results for the day-ahead market; or (iii) rely solely on the use of manual actions and on market results of the real-time market.[27] This revision reflects the fact that, although the CAISO can produce day-ahead market results as late as 8:00 p.m. on the day before the trading day, the CAISO believes it should provide market participants with the best available information by 6:00 p.m., including whether the CAISO anticipates that it will be able to publish market results. This will allow market participants to know their schedules and have enough lead time to meet their resource commitment instructions with sufficient advance notice.[28]

The CAISO's general preference will be to use the previous day's market results for the day-ahead market in the event of suspension. There are several reasons for this preference. First, using the previous day's market results will mitigate against the worst-case scenario in which the real-time market might also need to be suspended. Second, using the previous day's market results will provide the CAISO with a starting point for dispatch and settlement, while the real-time market can provide the incremental or decremental differences between the day-ahead and the real-time, thereby minimizing the need for the CAISO to issue manual dispatch instructions. Third, using the previous day's market results will allow market participants to know in advance their market results for the applicable trading day, which will minimize uncertainty and allow market participants to secure fuel and prepare their resources for unit commitment.

The CAISO will treat congestion revenue rights under the second (non-default) option differently because it settles congestion revenue rights based on the marginal congestion component produced in the integrated forward market, which is one of the market processes for the day-ahead market. If the CAISO decides to use the previous day's market results for the day-ahead market, it will settle congestion revenue rights based on the previous day's market results because the energy market will still be settled at the day-ahead prices. Thus,

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settle only physical bids using the day-ahead market results from the previous day. If the CAISO decides to rely solely on the results of the real-time market for pricing and settlement purposes, then there will be no settlement implications for virtual bids, because for that day there will be no virtual awards to settle. Final Proposal at 23-24.

[27] New tariff section 7.7.9(b)(2). This section is also cross-referenced in new tariff sections 7.7.3(b)(2) and 7.7.6(c)

[28] Final Proposal at 12; Board Memorandum at attachment A, page 4.

congestion revenue rights will be available to hedge against a market participant's exposure to day-ahead congestion charges. If, however, the CAISO determines that it should rely on the results of the real-time market for pricing and settlement purposes, the day-ahead market results will effectively neutralize the congestion revenue rights transactions for settlement purposes. As a result, the CAISO would settle congestion revenue rights, which are released ahead of the day-ahead market, at zero prices and would be unavailable to hedge against real-time congestion charges if not for the correcting effect of the different settlement treatment of congestion revenue rights.

b. Real-Time Market

For the real-time market, the CAISO proposes to modify the existing tariff rule stating that the CAISO will apply an administrative price for the imbalance energy market at the applicable price in the settlement period immediately preceding the settlement period in which the CAISO market intervention took place.[29] Always applying the administrative price based on the immediately preceding settlement period may not provide the correct price signal when system conditions change from hour to hour. As discussed below, the CAISO will use a more accurate and nuanced approach to apply the administrative price based on whether the real-time market (1) has not been suspended, in which event the CAISO will use different market results depending on the duration of the need for administrative prices, or (2) has been suspended, in which event the CAISO will use the previous day's market results for the corresponding trading hour.

i. Tariff Rules that Apply When the Real-Time Market Has Not Been Suspended

If a market disruption of the real-time market occurs when the real-time market has not been suspended, the CAISO will use three pairs of tariff rules, described below, to apply the administrative price according to the number of consecutive intervals during which market results are unavailable. The CAISO has adopted this approach to strike a just and reasonable balance among the following considerations: preserving price signals; providing price certainty; and practicality. This approach is comparable to the existing approaches used by the Midcontinent Independent System Operator, Inc. ("MISO") and PJM Interconnection, L.L.C. ("PJM").[30]

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[29] *See* existing tariff section 7.7.4(3).

[30] If a data input or program failure occurs, the MISO performs real-time ex post locational marginal price and real-time ex post market clearing price replacements using different methodologies that vary depending on whether the data input or program failure exists for eleven or fewer 5-minute dispatch intervals within the same hour or exists for

The first pair of tariff rules concerns relatively brief events not involving a market suspension.[31] If market results are unavailable for fewer than four consecutive 15-minute intervals in the fifteen minute market, the CAISO will use the fifteen minute market results, as applicable, for the fifteen-minute interval immediately preceding the fifteen minute market interval(s) for which fifteen minute market results are unavailable.[32] If prices are unavailable for fewer than 12 consecutive five-minute dispatch intervals, the CAISO will use the real-time dispatch market results, as applicable, for the dispatch interval immediately preceding the dispatch interval(s) for which market results are unavailable.[33] Thus, these two tariff rules will provide a clear and straightforward means for the CAISO to preserve the price signals from the immediately preceding intervals and provide price certainty for the market.

The second and third pairs of tariff rules concern more prolonged events not involving a market suspension.[34] The second pair of rules will apply when market results are unavailable for intervals in the fifteen minute market but available for the real-time dispatch, or when the converse is true. Specifically –

- If market results are unavailable for at least four consecutive fifteen-minute intervals in the fifteen minute market, but market results are available for the real-time dispatch during those fifteen minute market intervals, the CAISO will use the average of real-time dispatch market results, as applicable, during each such fifteen minute market interval and

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all dispatch intervals within the same hour. *See* MISO tariff, section 40.2.18. Under similar circumstances, PJM performs locational marginal price replacements using different methodologies that vary depending on whether the data input or program failure exists for fewer than six 5-minute intervals within the same hour or exists for more than six intervals within the same hour. *See* PJM Manual 11 (Revision No. 84), section 2.10.

[31] The Final Proposal and Board Memorandum refer to the first pair of tariff rules described in this paragraph as the "tier 1" rules. *See* Final Proposal at 14; Board Memorandum at 4.

[32] New tariff section 7.7.9(c)(1).

[33] New tariff section 7.7.9(c)(2).

[34] The Final Proposal and Board Memorandum refer collectively to the second and third pairs of tariff rules described below as the "tier 2" rules. *See* Final Proposal at 14-15; Board Memorandum at 4. Pages 15-17 of the Final Proposal provide illustrative hypothetical examples of how the CAISO will use market results under the tier 1 and tier 2 rules.

use the market results as applicable from the prior intervals for which market results are unavailable as needed;[35] and

- If market results are unavailable for at least 12 consecutive five-minute dispatch intervals, but market results are available for the fifteen minute market during those dispatch intervals, the CAISO will use the fifteen minute market results, as applicable, from the applicable fifteen minute market during the dispatch intervals.[36]

Applying administrative prices in this manner will reduce price risk and enhance price certainty for market participants with regard to differences in imbalance energy charges between the fifteen minute market and the five-minute real-time dispatch market.[37]

The third pair of tariff rules will apply when market results are unavailable during relatively prolonged intervals for both the fifteen minute market and the real-time dispatch. Specifically –

- If market results are unavailable for at least four consecutive 15-minute intervals in the fifteen minute market and for the real-time dispatch during those fifteen minute market intervals, the CAISO will use the day-ahead market results, as applicable, for the corresponding trading hour for which market results are unavailable;[38] and

- If market results are unavailable for at least 12 consecutive five-minute dispatch intervals and for the fifteen minute market during those dispatch intervals, the CAISO will use the previous day's day-ahead market results, as applicable, for the corresponding trading hour for which market results are unavailable.[39]

Applying administrative prices in this manner will provide price certainty and transparency for market participants because they will already know the previous day's day-ahead market results. Also, this approach will minimize market participants' potential exposure to imbalance energy charges between the day-

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35 New tariff section 7.7.9(c)(3).

36 New tariff section 7.7.9(c)(4).

37 Final Proposal at 14; Board Memorandum at 4.

38 New tariff section 7.7.9(c)(5).

39 New tariff section 7.7.9(c)(6).

ahead and real-time markets and the fifteen minute market and the five-minute real-time dispatch market.[40]

Some market participants expressed a preference for continuing to use the last available price to establish administrative prices in all circumstances. The CAISO, though, believes that using the last available price is a good pricing approach where there are small numbers of missing intervals, so that prices are relatively fresh and from an interval that would not likely have significant market differences. The CAISO proposes to use this as its default administrative price approach in the event none of the other circumstances described in tariff section 7.7.9 apply or if the market results are for any reason unavailable.[41] The CAISO, however, has taken stakeholder input into account to develop the pricing logic discussed above, which emphasizes reliance on prices from the same trading hours for longer disruptions. The CAISO believes this pricing logic both provides transparency and better aligns with market participants' expectations for the affected trading hours, for which they already know the day-ahead market results as described above.

ii. Tariff Rules that Apply When the Real-Time Market Has Been Suspended

Where the real-time market has been suspended, the CAISO will use the previous day's day-ahead market results, as applicable, for the trading hour corresponding to the trading hour during which the real-time market has been suspended.[42]

Applying day-ahead market results in this manner will have several benefits. First and most importantly, using the day-ahead market results will minimize any settlement implications because the CAISO will settle deviations of resources between the day-ahead market and the real-time market at a price difference of zero. It will also address the settlement of virtual bids because the CAISO will liquidate such bids at zero cost and profit. If the day-ahead market results do not fully compensate resources, the bid cost recovery mechanism under the tariff will use bids from the previous day-ahead market, while resources that are manually dispatched will be settled using the standard settlement mechanism that applies to exceptional dispatches. Further, using the day-ahead market results will provide price certainty and transparency to market participants

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40 Final Proposal at 15; Board Memorandum at 4.

41 New tariff section 7.7.9(e).

42 New tariff section 7.7.9(d). The Final Proposal and Board Memorandum refer to the tariff rules described in this paragraph as the "tier 3" rules. *See* Final Proposal at 17; Board Memorandum at 4.

because they will already know the day-ahead market price for the corresponding trading hour.

The CAISO and stakeholders explored the possibility of applying the administrative price by multiplying the last available day-ahead market price by a premium factor. They concluded, however, that, depending on the nature of the event that triggered the administrative price, a higher administrative price resulting from application of a premium factor will not always be the correct price, and resources may be required under some scenarios to decrement their generation or to shut down. Such scenarios would result in unintended imbalance energy charges for market participants and require implementing another mechanism to correct. For these reasons, the CAISO does not propose to use a premium factor in determining the administrative price.

The CAISO and stakeholders also considered and discarded the possibility of applying the administrative price using a pay-as-bid approach. They concluded that such an approach would be impracticable because there is no price for settlements of default load aggregation points because there are no real-time bids for load; the real-time market clears against forecasted load, not against bid-in demand. Further, there could be circumstances where no bid information is readily available to use to apply the administrative price. In such circumstances, the CAISO could use the last available bid, but that could present the same limitations the CAISO currently faces when it uses the last available price to apply the administrative price. Bids may change during the day, which means that bids submitted in the early morning may not reflect the bids submitted later in the day. In contrast, the proposed tariff rules described above will apply an administrative price using a simple and transparent process, which will provide more certainty and transparency in the marketplace.

In addition, the CAISO and stakeholders considered the option of constructing an administrative price that preserves the prevailing market conditions. They determined that this option was unworkable because it would require a meaningful set of assumptions regarding the market conditions that would have prevailed. For example, for the time immediately after the suspension, one possible approach would be to construct a price by taking a “snapshot” of the most recent market conditions for which data is available, but this approach would become unworkable once a longer period elapsed, because the snapshot from the beginning of the relevant time period would not reflect the conditions later in the time period. In that event, the CAISO would have to develop a set of assumptions for determining what the prevailing market conditions and dispatches would have been for that time. Moreover, any price that is different from the actual day-ahead price, whether above or below the day-ahead price, will have implications for settlements. For example, a price above the day-ahead price could, depending on the conditions of an event, require decrementing or shutting down generation.

The CAISO and stakeholders also considered whether the administrative price should apply across the entire system or be confined to specific regions of the system. Ideally, if the conditions requiring use of the administrative price exist only in a particular region, then the administrative price should apply only to that region. There are practical problems with this approach, however. Accurately defining the applicable regions on an *a priori* basis would be impractical because it is unlikely that the conditions requiring use of the administrative price would be confined to such a pre-defined region. Further, one of the complications that arose during the September 8-9, 2011 power outage was the operation of the market when the system was islanded, which eventually led to the market suspension. This suggests that, once a market suspension was in place, it would be impracticable to split the system among regions without creating the risk of discriminatory treatment of resources. Another problem is the need to perform congestion management among regions, given the difficulty of determining the congestion prices at the interfaces for the potential different regions. For all of these reasons, the CAISO proposes to maintain the existing, much more straightforward approach of applying administrative prices on a system-wide basis.[43]

c. Energy Imbalance Market

In tandem with adding new tariff section 7.7.9 as discussed above, the CAISO proposes to revise its existing tariff provisions regarding the actions the CAISO may take if it declares an interruption of participation by an Energy Imbalance Market ("EIM") entity in the real-time market. Pursuant to the tariff revisions, the CAISO may use market results in the real-time market in accordance with section 7.7.9 or take any actions specified in section 7.7.6 (addressing system operations in the event of a market disruption), except that if section 7.7.9 calls for the use of day-ahead market results, the CAISO will use: (i) the price specified in the EIM entity's open access transmission tariff as the locational marginal price; (ii) the EIM entity's EIM base schedule as the schedule; (iii) the EIM bid adder from the most recent corresponding interval that is available as the EIM bid adder; and (iv) the emissions rate set by the California Air Resources Board for an unspecified source multiplied by the daily greenhouse gas allowance price as calculated under the tariff.[44] This exception is necessary because there are no day-ahead prices in the EIM.

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[43] Currently, in the event of a market disruption, the CAISO applies administrative prices on a system-wide basis, and if any congestion was observed in the day-ahead market, any congestion observed in the day-ahead market and the prices resulting from that congestion are maintained with the administrative price.

[44] Revised tariff section 29.7(j)(2)(D).

3. Tariff Section 7.7.3 – Suspension of the CAISO Markets and Application of the Administrative Price

a. Proposed Tariff Revisions

The existing tariff permits the CAISO to "intervene" in the operation of the CAISO markets and to apply an administrative price if the CAISO determines that intervention is necessary in to prevent, contain, or correct a system emergency.[45] Revised section 7.7.3 more clearly describes the CAISO's ability to suspend the market and setting of an administrative price, in the absence of a market disruption,[46] if the CAISO determines that such suspension is necessary in order to prevent, contain, or correct a system emergency in accordance with section 7.7.3.[47]

b. Issues Raised in the Stakeholder Process

As discussed above, the existing tariff allows the CAISO to intervene in the operation of the CAISO markets to prevent, contain, or correct a system emergency. Some stakeholders suggested that the CAISO should replace the existing tariff language with language setting a hard threshold for triggering a market suspension, such as a specified percentage of lost load or a price threshold. Other stakeholders raised concerns about using such a hard trigger.

After considering the issue, the CAISO determined that a hard trigger would not capture the inherent complexity of the system and the myriad of potential scenarios that can arise. For example, a trigger set at 10 percent of lost load would mean that a 9 percent loss of load would not require a market suspension even when the facts indicated that the market was not producing an outcome in alignment with the system conditions. Alternatively, an 11 percent loss of load would trigger a market suspension even in circumstances where the market was producing reasonable results and thus did not appear to require suspension. As these hypothetical examples show, attempting to set a hard trigger based on an arbitrary specified percentage of lost load would be a futile exercise. It would be equally futile to set a hard trigger based on a price threshold, because it will not be possible to set a specific price threshold on an *a priori* basis that could capture any potential condition that may warrant a market

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[45] Existing tariff section 7.7.4. In this filing, the CAISO has renumbered existing tariff section 7.7.4 as revised tariff section 7.7.3.

[46] Actions that the CAISO may take when there is a market disruption are identified in revised section 7.7.6, which is substantively the same as existing section 7.7.15.1.

[47] Revised tariff section 7.7.3(a).

suspension. In some other cases, the need to suspend the market may actually not be reflected in the prices. For example, during the September 8-9, 2011 power outage, the CAISO did not need to suspend the market because prices exceeded certain levels. Rather, the CAISO needed to suspend the market because actual system conditions were not being reflected in the prices the market was generating based on inconsistent network topology information with respect to the load and generation connected to the system.[48]

For these reasons, the CAISO proposes to maintain and clarify the existing tariff authority allowing it to suspend the market and to apply an administrative price when necessary to prevent, contain, or correct a system emergency. The CAISO determines whether to suspend the market based primarily on whether dispatches and prices are aligned the overall system conditions. Also, following any occasion on which the CAISO suspends the market, the CAISO commits to provide to the market through a public forum a description of the conditions that led to the suspension. This commitment, together with the certainty of the administrative price to be used and the other tariff enhancements proposed in this filing, means that any CAISO decision to suspend the market will be transparent to market participants.[49]

4. Reorganizing and Clarifying Provisions for Handling Abnormal System Conditions

In addition to the proposed revisions to section 7.7 discussed above, the CAISO is fulfilling its commitment to clarify its provisions for handling abnormal system conditions (*e.g.*, system emergencies) by reordering the tariff provisions in a more logical sequence, updating the provisions (*e.g.*, to apply to the CAISO's new backup control center in Lincoln, California, rather than to the CAISO's former backup control center in Alhambra, California), employing more uniform terminology, eliminating duplicative and unnecessary provisions, addressing certain technical details in the business practice manual, and correcting grammatical and typographical errors. The CAISO also proposes related clarifications to definitions in appendix A to the tariff.[50]

As part of its reorganization and clarification efforts, the CAISO proposes to revise the existing definition "market disruption" in tariff appendix A to combine it with the definition of the term "market interruption," and to delete the term "market interruption." The revision defines a market disruption as an action or

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48 Final Proposal at 18.

49 Final Proposal at 18.

50 Tariff appendix A, revised definitions of "Alert, Warning Or Emergency (AWE) Notice," "Backup CAISO Control Center," and "Primary CAISO Control Center."

event that causes a failure of a CAISO market, related to system operation issues or system emergencies referred to in tariff sections 7.6, 7.7, and 34.10, including actions taken by the CAISO to prevent, manage, or minimize the extent of a market disruption. The existence of the two different terms has previously caused some confusion regarding the CAISO's authority and the basis for its actions. Consistent with these revisions, the CAISO also proposes to revise other tariff provisions so they refer to a market disruption rather than a market interruption.[51]

The net result of all of these revisions is to streamline, update, and make more understandable and coherent the tariff language and related definitions addressing the management of abnormal system conditions. In particular, the revisions more clearly set forth the relationship between suspension of the CAISO markets and application of administrative prices (tariff section 7.7.3), system operations in the event of a market disruption (tariff section 7.7.6), and the methodology for applying administrative prices as proposed in this filing (tariff section 7.7.9). Thus, the tariff revisions improve upon the existing tariff language.

The CAISO developed these proposed tariff revisions pursuant to multiple iterations of tariff language with its stakeholders. In June 2015, the CAISO posted the initial version of the tariff revisions and a table comparing, on a section-by-section basis, how the revised tariff language read compared with the existing tariff language. Following two conference calls with stakeholders in June and July 2015 and after considering their written comments, the CAISO posted a modified version of the tariff revisions in September 2015 that included bracketed notes explaining the rationales for the revisions and where existing tariff language had been moved from, moved to, or deleted. The CAISO again requested written stakeholder comments, and held another conference call in October 2015. The CAISO prepared and posted a further modified version of the tariff revisions in October 2016 that included the same types of bracketed notes and showed the incremental changes from the preceding version. Lastly, the CAISO held a conference call with stakeholders in November 2016 to review the latest version of the tariff revisions, and requested any final stakeholder comments.[52]

In order to facilitate the Commission's review of the tariff revisions, the CAISO is providing in attachment C to this filing an annotated, black-lined version

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[51] Revised tariff sections 11.5.6.1, 11.5.6.1.1, 11.5.6.2.5.2, 11.5.8.1; tariff appendix A, revised definition of "Excess Cost Payments."

[52] Further details regarding the stakeholder process are provided in attachment F to this filing.

of the final tariff revisions similar to what it provided to stakeholders. The attachment C document is in addition to the black-lined document required by Commission regulations (see attachment B to this filing).

B. Clarification of the Uncontrollable Force Provisions

Consistent with the guidance provided in the October 2014 Order regarding the stakeholder process for this tariff amendment,[53] the CAISO proposes to clarify the existing uncontrollable force provisions set forth in tariff section 14.1 and the CAISO's settlement rules. In response to the Powerex complaint, the CAISO explained that the obligation in the day-ahead market is a financial obligation, and therefore an event that prevents the delivery of scheduled energy is not an event that prevents a fulfillment of the tariff obligation. The Commission agreed: "Like other day-ahead market participants, Powerex is aware of the risks of derates and outages and the associated risk of submitting financially binding schedules in the day-ahead market that could subsequently be curtailed in real-time."[54] The Commission also noted, however, that "there appears to be confusion by stakeholders as to the applicability of the Uncontrollable Force provision in section 14.1 of CAISO's tariff" and that "[t]he tariff does not, on its face, explain the limits of applicability of section 14.1."[55] To address this shortcoming, the CAISO proposes to add a clarifying sentence to section 14.1 stating that the physical inability of a market participant to perform in accordance with a day-ahead schedule or ancillary service award for any reason will not relieve the market participant from its financial obligations under tariff section 11 (which concerns settlements and billing) that result from the failure to perform.

A stakeholder argued that resources transacting at the interties instead should be financially excused from imbalance charges they incur due to uncontrollable force events. The CAISO believes, however, that the proposed tariff revision is consistent with the nature of the CAISO's markets and the outcome of the Powerex complaint proceeding discussed above. A fundamental feature of the CAISO market design is that participants in the day-ahead market incur financially binding obligations based on their day-ahead awards, and the participants are obligated to pay for any uninstructed deviations from the day-ahead awards that may occur in the real-time. This provides the framework for allocating price risk between the day-ahead and real-time markets and is consistent with the principle that market participants should not be permitted to

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53 *See supra* section I.C of this transmittal letter.

54 October 2014 Order at P 28.

55 *Id.* at P 31.

enjoy the benefits of participating in the markets without also assuming the risks and costs of market participation. Further, excusing market participants from the settlement impacts of their uninstructed deviations due to a physical inability to perform would be unworkably burdensome and undermine market efficiency. It would be unworkably burdensome because failure to perform a tariff obligation is a common occurrence in all markets, including the CAISO's; the CAISO would be obliged to investigate each such occurrence on a case-by-case basis to determine whether the failure to perform was due to a physical inability to perform. This would undermine the efficiency of the market because the resettlements that would be required due to excusing market participants from the settlement impacts of their failure to perform would introduce a high level of uncertainty into the market, shift the risk of non-performance to load-serving entities that purchased power in the day-ahead market, and create a complicated issue as to who should bear the cost of the non-performance.

The CAISO also proposes to revise the title of section 14 to refer to "uncontrollable force" rather than the similarly defined term "force majeure." Section 14 includes provisions that use the term "uncontrollable force" but the term "force majeure" does not appear in the section (or indeed anywhere else in the tariff). The CAISO proposes to delete the definition of "force majeure" from appendix A to the tariff for the same reason. The definition is substantively the same as the definition of uncontrollable force.

III. Effective Date

The CAISO requests that the Commission accept the tariff revisions contained in this filing effective as of February 1, 2017.

IV. Communications

Correspondence and other communications regarding this filing should be directed to:

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V. Service

The CAISO has served copies of this filing on the California Public Utilities Commission, the California Energy Commission, and all parties with scheduling coordinator agreements under the CAISO tariff. In addition, the CAISO has posted a copy of the filing on the CAISO website.

VI. Contents of Filing

In addition to this transmittal letter, this filing includes the following attachments:

Attachment A	Clean CAISO tariff sheets incorporating this tariff amendment
Attachment B	Red-lined document showing the revisions contained in this tariff amendment
Attachment C	Red-lined document showing the tariff revisions the CAISO proposes to make and the reasons for the revisions in bracketed and highlighted text
Attachment D	Final Proposal
Attachment E	Board Memorandum
Attachment F	List of key dates in the stakeholder process

VII. Conclusion

For the reasons set forth in this filing, the CAISO respectfully requests that the Commission accept the tariff revisions proposed in the filing effective as of February 1, 2017.

Respectfully submitted,

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Attachment A – Clean Tariff Records

Tariff Amendment to Implement Administrative Pricing Policy and Tariff Clarifications
California Independent System Operator Corporation

November 23, 2016

7.7 Management Of Abnormal System Conditions

7.7.1 CAISO Actions in Imminent or Actual System Emergency

(a) Declaration of System Emergency. When, in the judgment of the CAISO, a System Emergency has occurred or is imminent, the CAISO will declare a System Emergency and issue an Emergency Notice to that effect, setting forth the actions that the CAISO is taking to address the System Emergency.

(b) Subsequent Notices Regarding System Emergency. Each time that the CAISO initiates any of the actions in Section 7.7.1(c) in response to a System Emergency, and at such time that the CAISO terminates any such action or resolves the System Emergency, the CAISO will issue a subsequent Emergency Notice setting forth the action or determination.

(c) Actions in Response to System Emergency. In response to a System Emergency, the CAISO may take any or all of the following actions as necessary to preserve or restore reliable, safe, and efficient service as quickly as reasonably practicable:

(1) suspend the CAISO Markets and apply an Administrative Price in accordance with Section 7.7.3;

(2) authorize full use of Black Start Generating Units;

(3) initiate full control of manual Load Shedding, in accordance with Section 7.7.3(c);

(4) authorize the curtailment of Curtailable Demand (even though not scheduled as an Ancillary Service) in accordance with Section 7.7.3(c); and

(5) take such other action that it considers necessary to preserve or restore stable operation of the CAISO Controlled Grid, to the extent such actions are consistent with Good Utility Practice and Applicable Reliability Criteria and not inconsistent with the CAISO Tariff.

(d) Termination of System Emergency. The CAISO will terminate the System Emergency and suspend the actions taken in response to the System Emergency when it determines, after conferring, as necessary, with Reliability Coordinators within the WECC, that the major factors contributing to the System Emergency have been

corrected, and all involuntarily interrupted Demand is back in service (except interrupted Curtailable Demand selected as an Ancillary Service).

(e) **Coordination with Neighboring Balancing Authority Areas.** The CAISO shall keep system operators in adjacent Balancing Authority Areas informed, as necessary, as to the nature and extent of the System Emergency in accordance with WECC procedures.

(f) **Emergency Guidelines.** The CAISO shall issue guidelines for all Market Participants to follow during a System Emergency consistent with the responsibilities set forth in Section 7.7.2 and in applicable Operating Procedures.

7.7.2 **Market Participant Responsibilities in System Emergencies.**

(a) **Response to CAISO Dispatch Instructions.** All Market Participants shall respond immediately to CAISO Dispatch Instructions during System Emergencies.

(b) **Responsibilities of UDCs and MSS Operators During a System Emergency**

(1) **Compliance with Directions and Procedures.** In the event of a System Emergency, UDCs and MSS Operators shall comply with all directions from the CAISO concerning the avoidance, management, and alleviation of the System Emergency and shall comply with all procedures concerning System Emergencies set forth in this CAISO Tariff, the Business Practice Manuals, and the Operating Procedures.

(2) **Communications.** During a System Emergency, the CAISO shall communicate with the UDCs and MSS Operators through their respective control centers and in accordance with procedures established in individual UDC and MSS Operating Agreements .

(3) **Notifications of End-Use Customers.** Each UDC and MSS Operator will notify its End-Use Customers connected to the UDC's or the MSS's Distribution System of any voluntary curtailments notified to the UDC or to the MSS Operator by the CAISO pursuant to the provisions of the Electrical Emergency Plan.

(c) Responsibilities of Generating Units, System Units, and System Resources During System Emergencies

(1) In General. All Generating Units and System Units that are owned or controlled by a Participating Generator are (without limitation to the CAISO's other rights under this CAISO Tariff) subject to control by the CAISO during a System Emergency and the CAISO shall have the authority to instruct a Participating Generator to bring its Generating Unit on-line or off-line or to increase or curtail the output of the Generating Unit and to alter scheduled deliveries of Energy and Ancillary Services into or out of the CAISO Controlled Grid, if such an instruction is reasonably necessary to prevent an imminent or threatened System Emergency or to retain Operational Control over the CAISO Controlled Grid during an actual System Emergency.

(2) Prerequisite for Dispatch Instructions. The CAISO shall, where reasonably practicable, use Ancillary Services which it has the contractual right to instruct and which are capable of contributing to containing or correcting the actual, imminent, or threatened System Emergency prior to issuing instructions to a Participating Generator under this subsection, except that the CAISO need not take such action if it determines such action is unlikely to be effective.

(3) RMR Condition 2 Units.

(A) Prerequisite for Dispatch Instructions. The CAISO shall only instruct an RMR Unit whose owner has selected Condition 2 of its RMR Contract to start-up and change its output if the CAISO has reasonably used all other available and effective resources to prevent a threatened System Emergency without declaring that a System Emergency exists.

(B) Compensation. If the CAISO dispatches a Condition 2 RMR Unit pursuant to subparagraph (A), it shall compensate that unit in accordance with Section 11.5.6.3 and allocate the costs in accordance with Section 11.5.6.3.2.

(4) Qualifying Facilities. A Scheduling Coordinator that represents a QF subject to an Existing QF Contract that is not subject to a PGA or Net Scheduled PGA will make reasonable efforts to require such QFs to comply with the CAISO's instructions during a System Emergency without penalty for failure to do so.

7.7.3 Suspension of CAISO Markets and Application of Administrative Price.

(a) In General. In the absence of a Market Disruption, the CAISO may suspend the CAISO Markets and apply Administrative Prices as provided in Section 7.7.9, if the CAISO determines that such suspension is necessary in order to prevent, contain, or correct a System Emergency in accordance with this Section 7.7.3.

(b) Suspension of DAM.

(1) Condition for Suspension. The CAISO will not suspend the operation of the Day-Ahead Market to manage a System Emergency unless there has been a total or major collapse of all or part of the CAISO Controlled Grid and the CAISO is in the process of restoring it or if the CAISO anticipates that it will not publish DAM results for any reason.

(2) Notification. In the event the CAISO determines it may suspend the DAM, it will notify Market Participants as set forth in Section 7.7.9(b)(2).

(c) Suspension of RTM. Before suspending the RTM to prevent or manage a System Emergency, the CAISO may take any or all of the following actions that it deems effective to mitigate the System Emergency –

(1) dispatch all reasonably effective Supply Bids offered or available to it regardless of price (including all Energy Bids and Ancillary Services Bids);

(2) subject to Section 3, notify the UDCs when the conditions to implement their existing Load curtailment programs have been met in accordance with their terms;

(3) dispatch or curtail all price-responsive Demand that has been bid into the Day-Ahead Market and exercise its rights under all Load curtailment contracts available to it;

(4) at its discretion, require direct control over Curtailable Demand;

(5) dispatch all interruptible Loads made available by UDCs to the CAISO in accordance with the relevant agreements with UDCs; or

(6) direct a UDC or an MSS Operator to disconnect load from the CAISO Controlled Grid in accordance with the prioritization schedule developed pursuant to Section 7.7.4(b), and exercise Load Shedding to curtail Demand on an involuntary basis, to the extent that the CAISO considers necessary or as instructed by the Reliability Coordinator.

(d) If a Load curtailment is required to manage System Emergencies, the CAISO will determine the amount and location of Load to be reduced and to the extent practicable, will allocate a portion to each UDC or MSS Operator based on the ratio of its Demand (at the time of the Balancing Authority Area annual peak for the previous year) to total Balancing Authority Area annual peak Demand for the previous year taking into account system considerations and the UDC's or MSS Operator's curtailment rights under their tariffs. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruption.

(e) **Termination of Market Suspension.** The suspension will cease as soon as conditions allow.

7.7.4 **Preparatory Actions for a System Emergency**

(a) **Periodic Tests Of Emergency Procedures.** The CAISO shall develop and administer periodic tests of System Emergency procedures designed to ensure that the CAISO Market Participants are capable of promptly and efficiently responding to imminent or actual System Emergencies.

(b) **Prioritization Schedule For Shedding And Restoring Load.** On an annual basis, the CAISO will, in collaboration with UDCs and MSSs and subject to the provisions of Section 3, develop a prioritization schedule for Load Shedding should a System Emergency require such action, which shall also establish a sequence for the restoration

of Load in the event that multiple UDCs or MSSs are affected by service interruptions and Load must be restored in blocks.

7.7.5 Actions Subsequent to a System Emergency

(a) Review of Major Outages. The CAISO, with the cooperation of any affected UDC, shall jointly perform a review following a major Outage that affects at least ten (10) percent of the Load served by the Distribution System of a UDC or any Outage that results in major damage to the CAISO Controlled Grid or to the health and safety of personnel, which shall address the cause of the Outage, the response time and effectiveness of emergency management efforts, and whether the operation, maintenance, or scheduling practices of the CAISO, any Participating TOs, Participating Generators, Eligible Customers, or UDCs enhanced or undermined the ability of the CAISO to maintain or restore service efficiently and in a timely manner.

(b) Report. The CAISO shall prepare a report on all major outages described in subsection (a) and shall share the report with Participating TOs, Participating Generators, Eligible Customers, and UDCs.

(c) Provision of Information and Opportunity to Comment. The CAISO shall seek the views of any Participating TOs, Participating Generators, Eligible Customers, UDCs, and Scheduling Coordinators affected by a System Emergency in the preparation of a report under subsection (b), and such affected entities shall promptly provide information requested by the CAISO. The CAISO shall give such affected entities an opportunity to comment on any issues arising during the preparation of the report.

7.7.6 System Operations In The Event Of A Market Disruption

(a) 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:

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

(2) remove Bids, including Self-Schedules, that have resulted in a Market Disruption previously, pursuant to Section 7.7.7;

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

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

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

(6) suspend the applicable CAISO Market and apply Administrative Prices established pursuant to Section 7.7.9;

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

(8) 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; or

(9) postpone the publication of DAM market results.

(b) Choices of Action to Prevent a Market Disruption, in the Event of a Market Disruption, or to Minimize the Extent of a Market Disruption. The CAISO's choice of action in the event of a Market Disruption shall depend on the CAISO Market that is disrupted, the cause of the Market Disruption, the expected time to resolve the Market Disruption, and the status of submitted Bids and Self-Schedules at the time the Market Disruption occurs.

(c) Notification. In the event the CAISO may not publish DAM results, it will notify Market Participants as set forth in Section 7.7.9(b)(2).

(d) Reports. The CAISO shall include reports on actions taken pursuant to this Section 7.7.6 in the Exceptional Dispatch report provided in Section 34.9.4 of the CAISO Tariff and shall include –

(1) the frequency and types of actions taken by the CAISO pursuant to this Section 7.7.6;

(2) the nature of the specific Market Disruptions that caused the CAISO to take action and the CAISO rationale for taking such actions, or the Market Disruption that was successfully prevented or minimized by the CAISO as a result of taking action pursuant to its authority under this Section 7.7.6; and

(3) general information on the Bids removed pursuant to Section 7.7.7, which may include the megawatt quantity, point of interconnection, specification of the Day-Ahead versus Real-Time Bid, and Energy or Ancillary Services Bid, and the CAISO's rationale for removal; except that any Scheduling Coordinator-specific individual Bid information will be submitted on a confidential basis consistent with FERC's rules and regulations governing requests for confidential treatment of commercially sensitive information.

7.7.7 Removal of Bids in the Event of a Market Disruption, to Prevent a Market Disruption, or to Minimize the Extent of a Market Disruption

(a) Types of Bids. The types of Bids that the CAISO may remove are Bids that are not feasible based on the misalignment of resource-specific conditions and physical constraints represented in the Master File, current outage information, and the Bid itself.

(b) Removal of a Portion of a Bid. The CAISO may remove part of a Bid, but retain other parts of the Bid for the applicable CAISO Market run and interval for the same or a different product, and may retain parts of the Bid for subsequent CAISO Market runs or intervals.

(c) Removal of a Bid Pursuant to Section 7.7.6(a)(2). If a particular Energy or Ancillary Service Bid must be removed pursuant to Section 7.7.6(a)(2), the CAISO will remove the entire Bid for that particular service and market.

(d) Resubmittal of Bids. The Scheduling Coordinator may resubmit removed Bids in subsequent CAISO Markets, provided the Scheduling Coordinator complies with any operator instructions regarding the subject Bids.

(e) **RUC Bids.** In the event the CAISO removes a Bid from an IFM run, the RUC Availability Bid associated with the removed IFM Bid may still be accepted for the corresponding RUC run, unless the CAISO determines that the RUC Availability Bid is the cause of the disruption.

(f) **RTM Bids.** If the CAISO removes a Bid in the advisory RTUC or RTD runs during the Real-Time Market, the CAISO may still use the removed Bid in the binding runs of the Real-Time Market for the same interval if the problems previously experienced with the Bid do not arise.

(g) **Energy Component of Ancillary Services Bids.** If the CAISO removes an Ancillary Services Bid submitted to the Real-Time Market, the CAISO may retain the associated Energy Bid for that CAISO Market run.

(h) **Settlement Consequences of Removal of Bids**

(1) **Day-Ahead Market.** In the event that a Bid is removed from the Day-Ahead Market, the Scheduling Coordinator whose Bid is removed will not be subject to Settlement for the Day-Ahead Market for the affected service.

(2) **Ancillary Services.** In the case of Ancillary Services Bids, including Submissions to Self-Provide an Ancillary Service, that are removed from the Day-Ahead Market, the Scheduling Coordinator will not receive Settlement for the Ancillary Services in the Day-Ahead Market and will not receive an opportunity cost payment in the Day-Ahead Market for the offered service.

(3) **Exceptional Dispatch.** In the event that a Bid is removed from a CAISO Market run or interval, the CAISO may subsequently be required to issue an Exceptional Dispatch for the resource, in which case the Scheduling Coordinator will receive Exceptional Dispatch Settlement as provided in Section 11.5.6.

(4) **Demand Bids.** In the event that a Demand Bid is removed from the Day-Ahead Market, because no Demand Bids for load can be submitted in the Real-Time Market, Scheduling Coordinators for the load not cleared in the Day-Ahead

Market will be settled as Uninstructed Imbalance Energy as provided in Section 11.5.2.

(i) Reporting to Affected Scheduling Coordinators. To the extent practicable, the CAISO will contact a Scheduling Coordinator's representative before removing a Bid and advise the representative of the issues encountered with the Bid as soon as practicable, but no later than three (3) Business Days, after the applicable Bid was removed and will provide information specifying when its Bid was removed and the nature of the disruption.

7.7.8 Under Frequency Load Shedding (UFLS).

Each UDC's UDCOA with the CAISO and each MSS Agreement through which the MSS Operator agrees to comply with the provisions of the CAISO Tariff shall describe the UFLS program for that UDC or for that MSS.

7.7.9 Application of Administrative Prices and Use of Prior Market Results

(a) In General. To manage an imminent or actual System Emergency or to prevent, manage, or minimize the extent of a Market Disruption, the CAISO will apply prior market results in accordance with this Section 7.7.9.

(b) Day-Ahead Market.

(1) Market Results. In the case of a suspension of the Day-Ahead Market –

(A) the CAISO shall use the Day-Ahead Market market results (except for Virtual Awards), as applicable, from the previous day for the Day-Ahead Market if the CAISO determines, based on expected system conditions, that using such market results will provide a reasonable profile of Schedules to meet the needs of the Real-Time;

(B) if the CAISO determines, based on expected system conditions, that using the Day-Ahead Market market results described in Section 7.7.9(b)(1)(A) will not reasonably meet the needs of the Real-Time, the CAISO may rely solely on the use of Exceptional Dispatch and other manual instructions and on the Real-Time Market market results, as applicable for pricing and Settlement purposes, except that

notwithstanding Section 11.2., Congestion Revenue Rights will be settled using the hourly average of the 15-minute FMM prices for each hour of the Real-Time Market.

(2) Notification. In the event the CAISO has not published the Day-Ahead Market market results or determines it may suspend the Day-Ahead Market, it will notify Market Participants by 6:00 p.m., indicating whether the CAISO anticipates it will –

(i) publish the Day-Ahead Market market results, and if so, when;

(ii) use the previous day's Day-Ahead Market market results pursuant to Section 7.7.9(b)(1)(A); or

(iii) rely on the use of Exceptional Dispatch and other manual instructions and on the Real-Time Market market results pursuant to Section 7.7.9(b)(1)(B).

(c) Real-Time Market Not Suspended. In the case of a Market Disruption of the Real-Time Market when the Real-Time Market has not been suspended –

(1) if market results are unavailable for fewer than four (4) consecutive 15-minute FMM intervals, the CAISO shall use the FMM market results, as applicable, for the FMM interval immediately preceding the FMM interval(s) for which FMM market results are unavailable;

(2) if market results are unavailable for fewer than twelve (12) consecutive 5-minute Dispatch Intervals, the CAISO shall use the RTD market results, as applicable, for the Dispatch Interval immediately preceding the Dispatch Interval(s) for which market results are unavailable;

(3) if market results are unavailable for at least four (4) consecutive 15-minute FMM intervals and market results are available for the RTD during those FMM intervals, the CAISO shall use the average of RTD market results, as applicable, during each such FMM interval and use the market results as applicable from the prior intervals for which market results are unavailable as needed;

(4) if market results are unavailable for at least twelve (12) consecutive 5-minute Dispatch Intervals and market results are available for the FMM during those Dispatch Intervals, the CAISO shall use the FMM market results, as applicable, from the applicable FMM during the Dispatch Intervals;

(5) if market results are unavailable for at least four (4) consecutive 15-minute FMM intervals and market results are unavailable for the RTD during those FMM intervals, the CAISO shall use the Day-Ahead Market market results, as applicable, for the corresponding Trading Hour for which market results are unavailable; and(6) if market results are unavailable for at least twelve (12) consecutive 5-minute Dispatch Intervals and market results are unavailable for the FMM during those Dispatch Intervals, the CAISO shall use the previous day's Day-Ahead Market market results, as applicable, for the corresponding Trading Hour for which market results are unavailable.

(d) Real-Time Market Suspended. In circumstances where the Real-Time Market has been suspended, the CAISO shall use the previous day's Day-Ahead Market market results, as applicable, for the Trading Hour corresponding to the Trading Hour during which the Real-Time Market has been suspended.

(e) Default Provision. In circumstances that are not described in subsections (a) through (d) of this section or if the market results are for any reason unavailable, the CAISO shall use market results, as applicable, from the most recent preceding applicable interval that produced acceptable market results.

7.7.10 CAISO Facility and Equipment Outages

(a) CAISO's Secure Communication System Unavailable

(1) Unavailable Critical Functions. During a total disruption of the CAISO's secure communication system –

(A) the CAISO's scheduling infrastructure computer systems will not be able to communicate with Scheduling Coordinators to receive any type of updated Bid or Schedule information;

(B) the CAISO's scheduling infrastructure computer systems will not be able to communicate Congestion Management information and Schedule changes to the Scheduling Coordinators; and

(C) the CAISO will not be able to communicate general information, including emergency information, to any Market Participants.

(2) Communications. During any period that the CAISO's secure communication system is unavailable, the CAISO shall –

(A) make all reasonable efforts to keep Market Participants aware of current CAISO Controlled Grid status using voice communications;

(B) use the most recent set of Day-Ahead Schedules, RUC Schedules, AS Awards, FMM Schedules, and Dispatch Instructions for each Scheduling Coordinator for the current and all future Settlement Periods and/or Trading Days until the CAISO's secure communication system is restored; and

(C) attempt to take critical Bids, including ETC and TOR Self-Schedules changes, from Scheduling Coordinators via voice communications as time and personnel availability allow.

(b) Primary CAISO Control Center Unavailability.

(1) Loss of all Voice Communications. In the event of loss of all voice communication at the Primary CAISO Control Center –

(A) the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center of the loss of voice communications;

(B) the Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system;

(C) additional voice notifications will be made as time permits; and

(D) once voice communications have been restored to the Primary CAISO Control Center, the CAISO will post this information on the CAISO's secure communication system.

(2) Complete Unavailability. In the event that the Primary CAISO Control Center becomes completely unavailable –

(A) the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center that the Primary CAISO Control Center is unavailable;

(B) the Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system;

(C) additional voice notifications will be made as time permits;

(D) the Backup CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid.

(E) the Backup CAISO Control Center will notify the Participating Transmission Owners by direct voice communication of the situation; and.

(F) once the Primary CAISO Control Center is again available, all functions will be transferred back, and the Primary CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

(3) CAISO Energy Management System (EMS) Unavailable. Should an outage occur to the redundant EMS computer systems in the Primary CAISO Control Center –

(A) EMS operation will transfer to the redundant EMS back up computers at the Backup CAISO Control Center;

(B) the Primary CAISO Control Center will post information on the CAISO's secure communication system that the Primary CAISO Control Center EMS computer is unavailable and that EMS control has been transferred to the Backup CAISO Control Center; and

(C) when the Primary CAISO Control Center EMS computer is restored, the Backup CAISO Control Center will initiate a transfer of the EMS system back to the Primary CAISO Control Center and the Primary CAISO Control Center will post information on the status of the restored EMS computer system on the CAISO's secure communication system.

(c) Backup CAISO Control Center.

(1) Loss of all Voice Communications. In the event of a loss of all voice communications at the Backup CAISO Control Center –

(A) the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center of the loss of voice communications;

(B) the Primary CAISO Control Center will post information on the situation via the CAISO's secure communication system;

(C) additional voice notifications will be made as time permits; and

(D) once voice communications have been restored to the Backup CAISO Control Center, the Primary CAISO Control Center will post this information on the CAISO's secure communication system.

(2) Control Center Completely Unavailable. In the event that the Backup CAISO Control Center becomes completely unavailable –

(A) the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center that the Backup CAISO Control Center is unavailable;

(B) the Primary CAISO Control Center will post information on the situation on the CAISO's secure communication system;

(C) additional voice notifications will be made as time permits;

(D) the Primary CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid;

(E) the Primary CAISO Control Center will notify the Participating Transmission Owners by direct voice communications of the situation; and

(F) once the Backup CAISO Control Center is again available, the Primary CAISO Control Center will transfer all functions back to the Backup CAISO Control Center, and the Backup CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

* * * *

11.5.6.1 Settlement for FMM or RTD IIE from Exceptional Dispatches used for System Emergency Conditions, for a Market Disruption, to Mitigate Overgeneration Conditions or to Prevent or Relieve Imminent System Emergencies

The Exceptional Dispatch Settlement price for incremental FMM or RTD IIE that is delivered as a result of an Exceptional Dispatch for System Emergency conditions, for a Market Disruption, to mitigate Overgeneration conditions, or to prevent or relieve an imminent System Emergency, including forced Start-Ups and Shut-Downs, is the higher of the (a) applicable FMM or RTD LMP, (b) the Energy Bid price, (c) the Default Energy Bid price if the resource has been mitigated through the MPM in the Real-Time Market and for the Energy that does not have an Energy Bid price, or (d) the negotiated price as applicable to System Resources. Costs for incremental Energy for this type of Exceptional Dispatch are settled in two payments: (1) incremental Energy is first settled at the applicable FMM or RTD LMP and included in the total IIE Settlement Amount described in Section 11.5.1.1; and (2) the incremental Energy Bid Cost in excess of the applicable FMM or RTD LMP at the relevant Location is settled pursuant to Section 11.5.6.1.1. The Exceptional Dispatch Settlement price for decremental IIE that is delivered as a result of an Exceptional Dispatch Instruction for a Market Disruption, or to prevent or relieve a System

Emergency, is the minimum of (a) the FMM or RTD LMP, (b) the Energy Bid price subject to Section 39.6.1.4, (c) the Default Energy Bid price if the resource has been mitigated through the MPM in the Real-Time Market and for the Energy that does not have an Energy Bid price, or (d) the negotiated price as applicable to System Resources. All Energy costs for decremental IIE associated with this type of Exceptional Dispatch are included in the total IIE Settlement Amount described in Section 11.5.1.1.

11.5.6.1.1 Settlement of Excess Cost Payments for Exceptional Dispatches used for System Emergency Conditions, for a Market Disruption, and to Avoid an Imminent System Emergency

The Excess Cost Payment for incremental Exceptional Dispatches used for emergency conditions, for a Market Disruption, or to avoid an imminent System Emergency is calculated for each resource for each Settlement Interval as the cost difference between the Settlement amount calculated pursuant to Section 11.5.6.1 for the applicable Exceptional Dispatch at the FMM or RTD LMP and delivered Exceptional Dispatch quantity at one of the following three costs: (1) the resource's Energy Bid Cost, (2) the Default Energy Bid cost, or (3) the Energy cost at the negotiated price, as applicable for System Resources, for the relevant Exceptional Dispatch.

* * * *

11.5.6.2.5.2 Allocation of Exceptional Dispatch Costs to Scheduling Coordinators

Excess Cost Payments for the Exceptional Dispatches used for emergency conditions and to avoid Market Disruption and System Emergencies as determined pursuant to Section 11.5.6.1.1 shall be charged to Scheduling Coordinators as follows in a two-step process. First, each Scheduling Coordinator's charge shall be the lesser of:

(i) the pro rata share of total Excess Cost Payment based upon the ratio of each Scheduling Coordinator's Net Negative Uninstructed Deviations to the total system Net Negative Uninstructed Deviations; or

(ii) the amount obtained by multiplying the Scheduling Coordinator's Net Negative Uninstructed Deviation for each Settlement Interval and a weighted average price. The weighted average price is equal to the total Excess Cost Payments to be allocated divided by the MWh of Exceptional Dispatch Energy associated with the Excess Cost Payment.

Second, any remaining unallocated costs shall be allocated to all Scheduling Coordinators pro-rata based on their Measured Demand. For a Scheduling Coordinator of an MSS Operator that has elected to follow Load, allocation of this second category of Excess Cost Payments will be based on net metered MSS Demand. In addition, to the extent the Exceptional Dispatches are made to resolve congestion internal to the MSS, the Scheduling Coordinator for such an MSS will also be subject to these two categories of Excess Cost Payments.

A Scheduling Coordinator shall be exempt from the first category of the Excess Cost Payment allocation for a Settlement Interval if the Scheduling Coordinator has sufficient incremental Energy Bids from physically available resources in the Real-Time Market for Energy to cover its Net Negative Uninstructed Deviation in the given Settlement Interval and the prices of such Energy Bids do not exceed the applicable maximum Bid level as set forth in Section 39.

* * * *

11.5.8.1 Settlement for Energy Purchased by the CAISO for System Emergency Conditions, to Avoid Market Disruption, or to Prevent or Relieve Imminent System Emergencies, Other than Exceptional Dispatch Energy

The Settlement price for Energy that is delivered to the CAISO from a utility in another Balancing Authority Area as a result of a CAISO request pursuant to Section 42.1.5 or any other provision for assistance in System Emergency conditions, to avoid a Market Disruption, or to prevent or relieve an imminent System Emergency, other than Energy from an Exceptional Dispatch, shall be either (i) a negotiated price agreed upon by the CAISO and the seller or (ii) a price established by the seller for such emergency assistance in advance, as may be applicable. In the event no Settlement price is established prior to the delivery of the emergency Energy, the default Settlement price shall be the simple average of the relevant FMM and RTD LMPs at the applicable Scheduling Point, plus all other charges applicable to imports to the CAISO Balancing Authority Area, as specified in the CAISO Tariff. If the default Settlement price is determined by the seller not to compensate the seller for the value of the emergency Energy delivered to the CAISO, then the seller shall have the opportunity to provide the CAISO with cost support information demonstrating that a higher price is justified. The cost support information must be provided in writing to the CAISO within thirty (30) days following the date of the provision of emergency assistance. The CAISO shall have the discretion to pay that higher price based on the seller's justification of this

higher price. The CAISO will provide notice of its determination whether to pay such a higher price within thirty (30) days after receipt of the cost support information. Any dispute regarding the CAISO's determination whether to pay a higher price for emergency assistance based on cost support information shall be subject to the CAISO ADR Procedures. Payment by the CAISO for such emergency assistance will be made in accordance with the Settlement process, billing cycle, and payment timeline set forth in the CAISO Tariff. The costs for such emergency assistance, including the payment of a price based on cost support information, will be settled in two payments: (1) the costs will first be settled at the simple average of the relevant Dispatch Interval LMPs and included in the total IIE Settlement Amount as described in Section 11.5.2.1; and (2) costs in excess of the simple average of the relevant Dispatch Interval LMPs plus other applicable charges will be settled in accordance with Section 11.5.8.1.1. The allocation of the amounts settled in accordance with Section 11.5.1.1 will be settled according to Section 11.5.4.2.

* * * *

14. Uncontrollable Force, Indemnity, Liabilities, and Penalties

14.1 Uncontrollable Forces

Neither the CAISO nor a Market Participant will be considered in default of any obligation under this CAISO Tariff if prevented from fulfilling that obligation due to the occurrence of an Uncontrollable Force. The physical inability of a Market Participant to perform in accordance with a Day-Ahead Schedule or Ancillary Service Award for any reason shall not relieve the Market Participant from its financial obligations under Section 11 that result from the failure to perform.

* * * *

16.3 Curtailment Under Emergency And Non-Emergency Conditions

16.3.1 Emergency Conditions

To the extent practicable, the CAISO shall allocate necessary curtailments of Existing Rights or non-Converted Rights under emergency conditions in accordance with the TRTC Instructions submitted by the Responsible PTO pursuant to Section 16.4. If circumstances prevent the CAISO’s compliance with such TRTC Instructions, the CAISO shall allocate such curtailments in a non-discriminatory manner consistent with Good Utility Practice and Applicable Reliability Criteria.

16.3.2 Non-Emergency Conditions

Unless otherwise specified by the Responsible PTO in the TRTC Instructions that it submits to the CAISO pursuant to Section 16.4, the CAISO will allocate any necessary curtailments under non-emergency conditions, pro rata, among holders of Existing Rights, at particular Scheduling Points and/or on particular contract paths, in the order of: (1) non-firm, (2) each priority of conditional firm, and (3) each priority of firm rights. Priorities for firm and conditional firm transmission service are indicated using the TRTC Instructions as described in Section 16.4.

* * * *

29.7 EIM Operations Under Normal And Emergency Conditions.

* * * *

(j) **EIM Disruption.**

(1) **Declaration.** The CAISO may declare an interruption of EIM Entity participation in the Real-Time Market when in its judgment—

(A) operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO Market Disruption) in the EIM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria; or

(B) communications between the CAISO and EIM Market Participants are disrupted and prevent an EIM Entity, EIM Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information.

(2) **CAISO Response to EIM Disruption.** If the CAISO declares an interruption of EIM Entity participation in the Real-Time Market, the CAISO may in its judgment, among other things—

(A) separate the affected EIM Entity Balancing Authority Area from the EIM Area and maintain the Real-Time Market for other Balancing Authority Areas in the EIM Area by enforcing a net transfer constraint for the affected Balancing Authority Area to separate it from the remainder of the EIM Area;

(B) reduce or suspend EIM Transfers between one or more Balancing Authority Areas in the EIM Area;

(C) instruct one or more EIM Entities to maintain system balance within their Balancing Authority Area without RTM Dispatch; or

(D) in addition or as an alternative, use market results in the Real-Time Market in accordance with Section 7.7.9 or take any of the actions specified in Section 7.7.6 with respect to the Real-Time Market, except that if Section 7.7.9 calls for the use of Day-Ahead Market results, the CAISO will use –

(i) the price specified in the EIM Entity's open access transmission tariff as the LMP;

(ii) the EIM Entity's EIM Base Schedule as the schedule;

(iii) the EIM Bid Adder from the most recent corresponding interval that is available as the EIM Bid Adder; and

(iv) the emissions rate set by the California Air Resources Board for an unspecified source multiplied by the daily Greenhouse Gas Allowance Price.

(3) **EIM Entity Responsibility.** In response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO, all EIM Entities shall follow NERC Reliability Standards applicable to their roles as Balancing Authorities in an effort to alleviate operational and system conditions and restore routine operations.

(4) **EIM Entity Scheduling Coordinator Responsibility.** All EIM Entity Scheduling

Coordinators shall promptly inform the CAISO of actions taken by the EIM Entities they represent in response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO through updates to their EIM Base Schedules, Interchange E-Tags, transmission limit adjustments, or Outage and derate information, as applicable.

(5) **System Restoration.** The CAISO shall reinstate normal operation of the Real-Time Market in the EIM Area at such time as it determines that the conditions that caused the interruption of EIM Entity participation in the Real-Time Market have been resolved.

* * * *

- Administrative Price

The market results determined according to Section 7.7.9.

* * * *

- Emergency Notice

An electronic notice issued by the CAISO regarding a System Emergency as set forth in the Business Practice Manual.

* * * *

- Backup CAISO Control Center

The alternate CAISO Control Center.

* * * *

- Excess Cost Payments

The payments made by the CAISO for costs associated with Exceptional Dispatches for 1) emergency conditions, to avoid Market Disruption and avoid an imminent System Emergency as provided in Section 11.5.6.1.1; 2) transmission-related modeling limitations as provided in Section 11.5.6.2.3; 3) Condition 2 RMR Units as provided in Section 11.5.6.3.2; and 4) emergency Energy as provided in Section 11.5.8.1.1.

* * * *

- Market Disruption

An action or event that causes a failure of a CAISO Market, related to system operation issues or System Emergencies referred to in Sections 7.6, 7.7, and 34.10, including actions taken by the CAISO to prevent, manage, or minimize the extent of a Market Disruption.

*** * * ***

- Primary CAISO Control Center

The CAISO Control Center.

Attachment B – Marked Tariff Records

Tariff Amendment to Implement Administrative Pricing Policy and Tariff Clarifications
California Independent System Operator Corporation

November 23, 2016

7.7 Management Of Abnormal System Conditions~~System Emergencies~~

7.7.1 CAISO Actions in Imminent or Actual System Emergency

(a) Declaration of System Emergency. When, in the judgment of the CAISO, a System Emergency has occurred or is imminent, ~~the System Reliability of the CAISO Controlled Grid is in danger of instability, voltage collapse or under-frequency caused by transmission or Generation trouble in the CAISO Balancing Authority Area, or events outside of the CAISO Balancing Authority Area that could result in a cascade of events throughout the WECC grid,~~ the CAISO will declare a System Emergency and issue an Emergency Notice to that effect, setting forth the actions that the CAISO is taking to address the System Emergency.

(b) Subsequent Notices Regarding System Emergency. Each time that the CAISO initiates any of the actions in Section 7.7.1(c) in response to a System Emergency, and at such time that the CAISO terminates any such action or resolves the System Emergency, the CAISO will issue a subsequent Emergency Notice setting forth the action or determination.

(c) Actions in Response to System Emergency. ~~This declaration may include a notice to~~ In response to a System Emergency, the CAISO may take any or all of the following actions as necessary to preserve or restore reliable, safe, and efficient service as quickly as reasonably practicable:

(1) suspend the CAISO ~~Day-Ahead and Real-Time~~ Markets and apply an Administrative Price in accordance with Section 7.7.3;~~,~~

(2) authorize full use of Black Start Generating Units;~~,~~

(3) initiate full control of manual Load Shedding, in accordance with Section 7.7.3(c);~~and~~

(4) authorize the curtailment of Curtailable Demand (even though not scheduled as an Ancillary Service) in accordance with Section 7.7.3(c); and~~.~~

(5) take such other action that it considers necessary to preserve or restore stable operation of the CAISO Controlled Grid, to the extent such actions are consistent

with Good Utility Practice and Applicable Reliability Criteria and not inconsistent with the CAISO Tariff.

(d) Termination of System Emergency. The CAISO will terminate~~reduce~~ the System Emergency and suspend the actions taken in response to the System Emergency when it determines~~declaration to a lower alert status when it is satisfied~~, after conferring, as necessary, with Reliability Coordinators within the WECC, that the major ~~contributing~~factors contributing to the System Emergency have been corrected, and all involuntarily interrupted Demand is back in service (except interrupted Curtailable Demand selected as an Ancillary Service). ~~This reduction in alert status will reinstate the competitive markets if they have been suspended.~~

~~**7.7.2 Emergency Procedures**~~

~~In the event of a System Emergency, the CAISO shall take such action as it considers necessary to preserve or restore stable operation of the CAISO Controlled Grid. The CAISO shall act in accordance with Good Utility Practice to preserve or restore reliable, safe and efficient service as quickly as reasonably practicable.~~

(e) Coordination with Neighboring Balancing Authority Areas. The CAISO shall keep system operators in adjacent Balancing Authority Areas informed, as necessary, as to the nature and extent of the System Emergency in accordance with WECC procedures. ~~and, where practicable, shall additionally keep the Market Participants within the Balancing Authority Area informed.~~

(f) Emergency Guidelines. The CAISO shall issue guidelines for all Market Participants to follow during a System Emergency consistent with the responsibilities set forth in Section 7.7.2 and in applicable Operating Procedures.

~~**7.7.2.1 Declarations of System Emergencies**~~

~~The CAISO shall, when it considers that conditions giving rise to a System Emergency exist, declare the existence of such System Emergency. A declaration by the CAISO of a System Emergency shall be binding on all Market Participants until the CAISO announces that the System Emergency no longer exists.~~

7.7.2 Market Participant Responsibilities in System Emergencies.

(a) Response to CAISO Dispatch Instructions. All Market Participants shall respond immediately to CAISO Dispatch Instructions during System Emergencies.

~~7.7.2.2~~ **(b) Responsibilities of UDCs and MSS~~s~~ Operators During a System Emergency**

(1) Compliance with Directions and Procedures. In the event of a System Emergency, UDCs and MSS Operators shall comply with all directions from the CAISO concerning the avoidance, management, and alleviation of the System Emergency and shall comply with all procedures concerning System Emergencies set forth~~out~~ in this CAISO Tariff, the Business Practice Manuals, and the Operating Procedures~~, and each MSS Operator shall comply with all directions from the CAISO concerning the avoidance, management and alleviation of the System Emergency and shall comply with all procedures concerning System Emergencies set forth in the CAISO Tariff, Business Practice Manuals and Operating Procedures.~~.

(2) Communications. During a System Emergency, the CAISO ~~and UDCs~~ shall communicate with the UDCs and MSS Operators through their respective control centers and in accordance with procedures established in individual UDC and MSS Operating Agreements~~, and the CAISO and the MSS Operator shall communicate through their respective control centers and in accordance with procedures established in the MSS Agreement~~.

(3) Notifications of End-Use Customers. Each UDC and MSS Operator will notify its End-Use Customers connected to the UDC's or the MSS's Distribution System of any voluntary curtailments notified to the UDC or to the MSS Operator by the CAISO pursuant to the provisions of the Electrical Emergency Plan.

~~7.7.2.3~~ **(c) Responsibilities of Generating Units, System Units, and System Resources During System Emergencies**

(1) In General. All Generating Units and System Units that are owned or controlled by a Participating Generator are (without limitation to the CAISO's other rights under this CAISO Tariff) subject to control by the CAISO during a System

Emergency and ~~in circumstances in which the CAISO considers that a System Emergency is imminent or threatened. T~~the CAISO shall~~, subject to this Section 7,~~ have the authority to instruct a Participating Generator to bring its Generating Unit on-line~~,~~ or off-line~~,~~ or to increase or curtail the output of the Generating Unit and to alter scheduled deliveries of Energy and Ancillary Services into or out of the CAISO Controlled Grid, if such an instruction is reasonably necessary to prevent an imminent or threatened System Emergency or to retain Operational Control over the CAISO Controlled Grid during an actual System Emergency.

(2) Prerequisite for Dispatch Instructions. The CAISO shall, where reasonably practicable, use Ancillary Services which it has the contractual right to instruct and which are capable of contributing to containing or correcting the actual, imminent, or threatened System Emergency prior to issuing instructions to a Participating Generator under this subsection, except that the CAISO need not take such action if it determines such action is unlikely to be effective.

(3) RMR Condition 2 Units.

(A) Prerequisite for Dispatch Instructions. The CAISO shall only~~have the authority to~~ instruct an RMR Unit whose owner has selected Condition 2 of its RMR Contract to start-up and change its output if the CAISO has reasonably used all other available and effective resources to prevent a threatened System Emergency without declaring that a System Emergency exists.

(B) Compensation. If the CAISO dispatches~~so instructs~~ a Condition 2 RMR Unit pursuant to subparagraph (A), it shall compensate that unit in accordance with Section 11.5.6.3 and allocate the costs in accordance with Section 11.5.6.3.2.

(4) Qualifying Facilities. A Scheduling Coordinator that represents a~~Each~~ QF subject to an Existing QF Contract that is ~~and~~ not subject to a PGA or Net Scheduled PGA will make reasonable efforts to require such QFs to comply with

the CAISO's instructions during a System Emergency without penalty for failure to do so.

~~**7.7.3 Notifications By CAISO Of System Conditions**~~

~~The CAISO will provide the following notifications to Market Participants to communicate unusual system conditions or emergencies.~~

~~**7.7.3.1 System Alert**~~

~~CAISO will give an AWE Notice of a system alert when the operating requirements of the CAISO Controlled Grid are marginal because of Demand exceeding forecast, loss of major Generation or loss of transmission capacity that has curtailed imports into the CAISO Balancing Authority Area, or if it otherwise appears that there is insufficient Energy and Ancillary Services to meet Real-Time Demand in the CAISO Balancing Authority Area.~~

~~**7.7.3.2 System Warning**~~

~~The CAISO will give an AWE Notice of a system warning when the operating requirements for the CAISO Controlled Grid are not being met in the Real-Time Market, or the quantity of Regulation, Spinning Reserve, Non-Spinning Reserve, and Energy available to the CAISO is not acceptable for the Applicable Reliability Criteria. This system warning notice will notify Market Participants that the CAISO will, acting in accordance with Good Utility Practice, take such steps as it considers necessary to ensure compliance with Applicable Reliability Criteria, including the negotiation of commitments for Generation through processes other than competitive Bids.~~

7.7.3~~7.7.4~~ Suspension of~~Intervention In~~ CAISO Markets and Application of Administrative Price.~~Operations~~

(a) In General. In the absence of a Market Disruption, ~~T~~the CAISO may suspend~~intervene in the operation of~~ the CAISO Markets and apply ~~set the~~ Administrative Prices as provided in Section 7.7.9, if the CAISO determines that such suspension~~intervention~~ is necessary in order to prevent, contain, or correct a System Emergency in accordance with this Section 7.7.3~~as follows~~.

(b) Suspension of DAM.

(1) Condition for Suspension. The CAISO will not suspend~~intervene in~~ the operation of the Day-Ahead Market to manage a System Emergency unless there has been a total or major collapse of all or part of the CAISO Controlled Grid and the CAISO is in the process of restoring it or if the CAISO anticipates that it will not publish DAM results for any reason. ~~The CAISO shall, where reasonably practicable, utilize Ancillary Services which it has the contractual right to instruct and which are capable of contributing to containing or correcting the actual, imminent or threatened System Emergency prior to issuing instructions to a Participating Generator under Section 7.7.2.3. In the event that the CAISO has exhausted all Economic Bids in the IFM, the CAISO shall use the scheduling priorities listed in Section 31.4 to clear the IFM.~~

(2) Notification. In the event the CAISO determines it may suspend the DAM, it will notify Market Participants as set forth in Section 7.7.9(b)(2).

(c) Suspension of RTM. Before suspending the RTM to prevent or manage a System Emergency,~~any such intervention~~ the CAISO ~~must (in the following order):~~ may take any or all of the following actions that it deems effective to mitigate the System Emergency –

(1)~~(a)~~ dispatch all reasonably effective Supply Bids offered or available to it regardless of price (including all Energy Bids and Ancillary Services Bids);

(2) subject to Section 3, notify the UDCs when the conditions to implement their existing Load curtailment programs have been met in accordance with their terms;

(3) dispatch or curtail all price-responsive Demand that has been bid into the Day-Ahead Market and exercise its rights under all Load curtailment contracts available to it;

(4) at its discretion, require direct control over Curtailable Demand;

(5)~~(b)~~ dispatch all interruptible Loads made available by UDCs to the CAISO in accordance with the relevant agreements with UDCs; or ~~(c) dispatch or curtail all price-responsive Demand that has been bid into the Day-Ahead Market and exercise its rights under all Load curtailment contracts available to it;~~

(6) direct a UDC or an MSS Operator to disconnect load from the CAISO Controlled Grid in accordance with the prioritization schedule developed pursuant to Section 7.7.4(b), and~~(d)~~ exercise Load Shedding to curtail Demand on an involuntary basis, to the extent that the CAISO considers necessary or as instructed by the Reliability Coordinator.

(d) If a Load curtailment is required to manage System Emergencies, the CAISO will determine the amount and location of Load to be reduced and to the extent practicable, will allocate a portion to each UDC or MSS Operator based on the ratio of its Demand (at the time of the Balancing Authority Area annual peak for the previous year) to total Balancing Authority Area annual peak Demand for the previous year taking into account system considerations and the UDC's or MSS Operator's curtailment rights under their tariffs. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruption.

~~(3) The Administrative Price in relation to each of the markets for Imbalance Energy and Ancillary Services shall be set at the applicable price in the Settlement Period immediately preceding the Settlement Period in which the intervention took place.~~

(e)~~(4)~~ **Termination of Market Suspension.** The suspension~~intervention~~ will cease as soon as conditions allow.~~the CAISO has restored all Demand that was curtailed on an involuntary basis.~~

~~**7.7.5 Emergency Guidelines**~~

~~The CAISO shall issue guidelines for all Market Participants to follow during a System Emergency. These guidelines shall be consistent with the specific obligations of Scheduling Coordinators and Market~~

~~Participants referenced in Sections 7.7.10, 7.7.11, 7.7.2, 7.7.2.3 and 7.7.4(1). All Market Participants shall respond to CAISO Dispatch Instructions with an immediate response during System Emergencies.~~

~~**7.7.5.1** The CAISO shall in accordance with this Section 7.7.5 implement the Electrical Emergency Plan in consultation with the UDCs, the MSS Operators, or other entities, at the CAISO's discretion, when Energy reserve margins are forecast to be at the levels specified in the plan.~~

~~**7.7.5.2** Each UDC and MSS Operator will notify its End-Use Customers connected to the UDC's or the MSS's Distribution System of any voluntary curtailments notified to the UDC or to the MSS Operator by the CAISO pursuant to the provisions of the EEP.~~

7.7.4~~7.7.6~~ Preparatory Actions for a System Emergency

(a) Periodic Tests Of Emergency Procedures. The CAISO shall develop and administer periodic ~~unannounced~~ tests of System Emergency procedures~~. Such tests shall be~~ designed to ensure that the CAISO Market Participants are capable of promptly and efficiently responding to imminent or actual System Emergencies.

~~7.7.7~~ **(b) Prioritization Schedule For Shedding And Restoring Load.** On an annual basis, the CAISO ~~shall, in~~ will, in collaboration ~~consultation~~ with UDCs and MSS~~Market Participants~~ and subject to the provisions of Section 3, develop a prioritization schedule for Load Shedding should a System Emergency require such action, which~~. The prioritization schedule~~ shall also establish a sequence for the restoration of Load in the event that multiple UDCs or MSS~~Scheduling Coordinators or Market Participants~~ are affected by service interruptions and Load must be restored in blocks. ~~For Load shed in accordance with Section 7.7.11.4.2, the prioritization schedule will only include those UDCs or MSS Operators that have Scheduling Coordinators that have failed to submit Bids with sufficient resources to meet the Load in the UDC or MSS Service Area. For Load shed in accordance with Section 7.7.11.4.3, the prioritization schedule will include all UDCs and MSS Operators.~~

~~**7.7.9 [NOT USED]**~~

~~**7.7.10 Further Obligations Relating To System Emergencies**~~

~~The CAISO and Participating TOs shall comply with their obligations in Section 9 of the TCA.~~

7.7.11 Use Of Load Curtailment Programs

7.7.11.1 Use of UDC's Existing Load Curtailment Programs

As an additional resource for managing System Emergencies, the CAISO will, subject to Section 3, notify the UDCs when the conditions to implement their Load curtailment programs have been met in accordance with their terms. The UDCs will exercise their best efforts, including seeking any necessary regulatory approvals, to enable the CAISO to rely on their curtailment rights at specified levels of Operating Reserve. Each UDC shall by not later than October 1 of each year advise the CAISO of the capabilities of its Load curtailment programs for the forthcoming year, and the conditions under which those capabilities may be exercised, and shall give the CAISO as much notice as reasonably practicable of any change to such programs.

7.7.11.2 Load Curtailment

A Scheduling Coordinator may specify that Loads will be reduced at specified prices or, pursuant to a Participating Load Agreement, offer the right to exercise Load curtailment to the CAISO as an Ancillary Service or utilize Load curtailment itself (by way of self-provision of Ancillary Services) as Non-Spinning Reserve. The CAISO, at its discretion, may require direct control over such Curtailable Demand to assume response capability for managing System Emergencies. However, non-firm Loads shall not be eligible to provide Curtailable Demand if they are receiving incentives for interruption under existing programs approved by a Local Regulatory Authority, unless: a) participation in the CAISO's Ancillary Services markets is specifically authorized by such Local Regulatory Authority, and b) there exist no contingencies on the availability, nor any unmitigated incentives encouraging prior curtailment, of such interruptible Load for Dispatch as Curtailable Demand as a result of the operation of such existing program. The CAISO may establish standards for automatic communication of curtailment instructions to implement Load curtailment as a condition for accepting any offered Load curtailment as an Ancillary Service.

7.7.11.3 The CAISO shall have the authority to direct a UDC or an MSS Operator to disconnect Load from the CAISO Controlled Grid if necessary to avoid an anticipated System Emergency or to regain Operational Control over the CAISO Controlled Grid during an actual System Emergency. The CAISO shall direct the UDC or the MSS Operator to shed Load in accordance with the prioritization schedule

developed pursuant to Section 7.7.7. When CAISO Controlled Grid conditions permit restoration of Load, the CAISO shall restore Load according to the prioritization schedule developed pursuant to Section 7.7.7. The MSS Operator shall restore Load internal to the MSS.

7.7.11.4 Load Shedding

7.7.11.4.1 [NOT USED]

7.7.11.4.2 If the CAISO forecasts in advance of the RTM that Load curtailment will be necessary due to a resource deficiency as determined pursuant to Section 40.7, the CAISO will identify any UDC or MSS Service Area that is resource deficient. The CAISO will provide notice to all Scheduling Coordinators if one or more UDC or MSS is deficient. If Load curtailment is required to manage a System Emergency associated with a resource deficiency determined pursuant to Section 40.7, the CAISO will determine the amount and location of Load to be curtailed and will allocate a portion of that required Load curtailment to each UDC or MSS Operator whose Service Area has been identified as being resource-deficient based on the ratio of its resource deficiency to the total Balancing Authority Area resource deficiency. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruptions.

7.7.11.4.3 If a Load curtailment is required to manage System Emergencies, in any circumstances other than those described in Section 7.7.11.4.2, the CAISO will determine the amount and location of Load to be reduced and to the extent practicable, will allocate a portion to each UDC or MSS Operator based on the ratio of its Demand (at the time of the Balancing Authority Area annual peak for the previous year) to total Balancing Authority Area annual peak Demand for the previous year taking into account system considerations and the UDC's or MSS Operator's curtailment rights under their tariffs. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruption.

7.7.12 Curtailment Under Emergency And Non-Emergency Conditions

7.7.12.1 Emergency Conditions

To the extent practicable, the CAISO shall allocate necessary curtailments of Existing Rights or non-Converted Rights under emergency conditions in accordance with the instructions submitted by the Responsible PTO pursuant to Section 16. If circumstances prevent the CAISO's compliance with such

~~instructions, the CAISO shall allocate such curtailments in a non-discriminatory manner consistent with Good Utility Practice.~~

~~**7.7.12.2 Non-Emergency Conditions**~~

~~Unless otherwise specified by the Responsible PTO in the instructions that it submits to the CAISO under Section 16, the CAISO will allocate any necessary curtailments under non-emergency conditions, pro rata, among holders of Existing Rights, at particular Scheduling Points and/or on particular contract paths, in the order of: (1) non-firm, (2) each priority of conditional firm, and (3) each priority of firm rights. Priorities for firm and conditional firm transmission service are indicated using the TRTC Instructions as described in Section 16.~~

7.7.5~~13~~ Actions Subsequent to a System Emergency~~System Emergency Reports And Sanctions~~

~~**7.7.13.1**~~

(a) Review of Major Outages. The CAISO, with the cooperation of any affected UDC, shall jointly perform a review following a major Outage that affects at least ten (10) percent of the Load served by the Distribution System of a UDC or any Outage that results in major damage to the CAISO Controlled Grid or to the health and safety of personnel, which~~.~~ ~~The review~~ shall address the cause of the Outage, the response time and effectiveness of emergency management efforts, and whether the operation, maintenance, or scheduling practices of the CAISO, any Participating TOs, Participating Generators, Eligible Customers, or UDCs ~~or Participating Generators~~ enhanced or undermined the ability of the CAISO to maintain or restore service efficiently and in a timely manner.

(b) Report. The CAISO shall prepare a report on all major outages described in subsection (a) and shall share the report with Participating TOs, Participating Generators, Eligible Customers, and UDCs.

~~**7.7.13.2 Provide Information to Review Outages**~~

(c) Provision of Information and Opportunity to Comment. ~~Participating TOs, Participating Generators, Eligible Customers, Scheduling Coordinators and UDCs shall promptly provide information requested by the CAISO to review Outages pursuant to Section 7.7.13.1 and to prepare Outage reports.~~ The CAISO shall seek the views of any

~~affected~~ Participating TOs, Participating Generators, Eligible Customers, UDCs, and Scheduling Coordinators ~~or UDCs~~ affected by a System Emergency in the preparation of a report under subsection (b), and such affected entities shall promptly provide information requested by the CAISO. The CAISO shall give ~~and allow~~ such affected entities ~~Participating TOs, Participating Generators, Eligible Customers, Scheduling Coordinators or UDCs~~ an opportunity to comment on any issues arising during the preparation of the ~~a~~ report. ~~All findings and reports arising from the CAISO's review shall be shared with Participating TOs, Participating Generators, Eligible Customers and UDCs.~~

~~**7.7.13.3 [NOT USED]**~~

~~**7.7.14 CAISO Facilities And Equipment**~~

~~**7.7.14.1 CAISO Facility and Equipment Outages**~~

~~The CAISO has installed redundant control centers, communication systems and computer systems. Most, but not necessarily all, equipment problems or failures should be transparent to Market Participants. This Section 7.7.14.1 addresses some situations when Market Participants could be affected, but it is impossible to identify and plan for every type of equipment problem or failure. Real-Time situations will be handled by the Real-Time CAISO dispatchers. The CAISO control room in Folsom is the Primary CAISO Control Center and the CAISO control room in Alhambra is the Backup CAISO Control Center.~~

~~**7.7.14.2 CAISO's Secure Communication System Unavailable**~~

~~**7.7.14.2.1 Unavailable Critical Functions of CAISO's Secure Communication System**~~

~~During a total disruption of the CAISO's secure communication system several critical functions of the CAISO will not be available including:~~

~~(a) the CAISO's scheduling infrastructure computer systems will not be able to communicate with Scheduling Coordinators to receive any type of updated Bid or Schedule information;~~

(b) the CAISO's scheduling infrastructure computer systems will not be able to communicate Congestion Management information and Schedule changes to the Scheduling Coordinators; and

(c) the CAISO will not be able to communicate general information, including emergency information, to any Market Participants.

7.7.14.2.2 Communications during Unavailability of CAISO's Secure Communication System

During any period of CAISO's secure communication system unavailability, the CAISO shall:

(a) make all reasonable efforts to keep Market Participants aware of current CAISO Controlled Grid status using voice communications;

(b) use the most recent set of Day-Ahead Schedules, RUC Schedules, AS Awards, FMM Schedules, and Dispatch Instructions for each Scheduling Coordinator for the current and all future Settlement Periods and/or Trading Days until the CAISO's secure communication system is restored; and

(c) attempt to take critical Bids, including ETC and TOR Self-Schedules changes, from Scheduling Coordinators via voice communications as time and personnel availability allows.

7.7.14.2.3 Primary CAISO Control Center – Loss of all Voice Communications

In the event of loss of all voice communication at the Primary CAISO Control Center, the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center of the loss of voice communications. The Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits. Once voice communications have been restored to the Primary CAISO Control Center, the CAISO will post this information on the CAISO's secure communication system.

7.7.14.2.4 Primary CAISO Control Center – Control Center Completely Unavailable

In the event that the Primary CAISO Control Center becomes completely unavailable, the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center that the Primary CAISO Control Center is unavailable. The Backup CAISO Control Center will post information on

~~the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits.~~

~~The Backup CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid. The Backup CAISO Control Center will notify the single point of contact at the transmission operations center of Pacific Gas and Electric Company by direct voice communication of the situation.~~

~~Once the Primary CAISO Control Center is again available, all functions will be transferred back, and the Primary CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.~~

~~7.7.14.2.5 Primary CAISO Control Center - CAISO Energy Management System (EMS) Unavailable~~

~~Should an outage occur to the redundant EMS computer systems in the Primary CAISO Control Center, an auto transfer should occur to transfer EMS operation to the redundant EMS back up computers at the Backup CAISO Control Center. Due to the severity of a total CAISO EMS computer outage, the Primary CAISO Control Center will post information on the CAISO's secure communication system that the Primary CAISO Control Center EMS computer is unavailable and that EMS control has been transferred to the Backup CAISO Control Center.~~

~~When the Primary CAISO Control Center EMS computer is restored, the Backup CAISO Control Center will initiate a transfer back of the EMS system to the Primary CAISO Control Center. The Primary CAISO Control Center will post information on the restored EMS computer system status on the CAISO's secure communication system.~~

~~7.7.14.2.6 Backup CAISO Control Center – Loss of all Voice Communications~~

~~In the event of a loss of all voice communications at the Backup CAISO Control Center, the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center of the loss of voice communications. The Primary CAISO Control Center will post information on the situation via the CAISO's secure communication system. Additional voice notifications will be made as time permits. Once voice communications have been restored to the Backup CAISO Control Center, the Primary CAISO Control Center will post this information on the CAISO's secure communication system.~~

~~7.7.14.2.7 Backup CAISO Control Center – Control Center Completely Unavailable~~

~~In the event that the Backup CAISO Control Center becomes completely unavailable, the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center that the Backup CAISO Control Center is unavailable. The Primary CAISO Control Center will post information on the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits.~~

~~The Primary CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid. The Primary CAISO Control Center will notify the grid control center of Southern California Edison Company by direct voice communications of the situation.~~

~~Once the Backup CAISO Control Center is again available, all functions will be transferred back, and the Backup CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.~~

7.7.6~~15~~ System Operations In The Event Of A Market Disruption

~~**7.7.15.1**~~

(a) Actions in the Event of a Market Disruption, to Prevent a Market Disruption, or to ~~m~~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:

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

(2)~~(b)~~ remove Bids, including Self-Schedules, that have resulted in a Market Disruption previously, pursuant to Section 7.7.7;

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

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

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

(6)~~(f)~~ suspend the applicable CAISO Market and apply~~utilize~~ Administrative Prices established pursuant to Section 7.7.9~~to settle metered Supply and Demand~~;

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

(8)~~(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; or~~.~~

(9) postpone the publication of DAM market results.

(b) Choices of Action to Prevent a Market Disruption, in the Event of a Market Disruption, or to Minimize the Extent of a Market Disruption. The CAISO's choice of action in the event of a Market Disruption shall depend on the CAISO Market that is disrupted, the cause of the Market Disruption, the expected time to resolve the Market Disruption, and the status of submitted Bids and Self-Schedules at the time the Market Disruption occurs.

(c) Notification. In the event the CAISO may not publish DAM results, it will notify Market Participants as set forth in Section 7.7.9(b)(2).

(d) Reports. The CAISO shall include reports on actions taken pursuant to this Section 7.7.6 in the Exceptional Dispatch report provided in Section 34.9.4 of the CAISO Tariff and shall include –

(1) the frequency and types of actions taken by the CAISO pursuant to this Section 7.7.6;

(2) the nature of the specific Market Disruptions that caused the CAISO to take action and the CAISO rationale for taking such actions, or the Market Disruption that was successfully prevented or minimized by the CAISO as a result of taking action pursuant to its authority under this Section 7.7.6; and

(3) general information on the Bids removed pursuant to Section 7.7.7, which may include the megawatt quantity, point of interconnection, specification of the Day-Ahead versus Real-Time Bid, and Energy or Ancillary Services Bid, and the

CAISO's rationale for removal; except that any Scheduling Coordinator-specific individual Bid information will be submitted on a confidential basis consistent with FERC's rules and regulations governing requests for confidential treatment of commercially sensitive information.

7.7.7~~15.2~~ Removal of Bids~~,~~ in the Event of a Market Disruption, to Prevent a Market Disruption, or to ~~m~~Minimize the Extent of a Market Disruption

~~**7.7.15.2.1 Objective Measures**~~

(a) Types of Bids. ~~In the event of a Market Disruption, to prevent a Market Disruption, or to minimize the extent of a Market Disruption, as provided in Section 7.7.15.1 (b), the CAISO may remove Bids, which as defined include Self-Schedules, from the relevant CAISO Market.~~ The types of Bids that the CAISO may remove ~~include those that have previously caused a Market Disruption. These~~ are Bids that are not feasible based on the misalignment of resource-specific conditions and physical constraints represented in the Master File, current outage information, and the Bid itself. ~~For example, these include: (1) Bids that pass through the automated Bid validation rules but are invalid for other reasons not detectable by the automated Bid validation, including derates reflected in the CAISO's outage management system pursuant to Section 9; (2) Bids that are identified prior to the end of the CAISO Market run as causing a feasibility issue that prevents the CAISO Market run from clearing in the time allotted for the run, including Ramping rates in the CAISO's outage management system pursuant to Section 9 that result in infeasible generation Bids; and (3) multiple Bids that do not pose a problem for processing through the CAISO Market when considered individually, but may when submitted in combination with other Bids become infeasible and present an impediment to the successful completion of the CAISO Market.~~

~~**7.7.15.2.2 Consequences of Removal of a Bid**~~

(b) Removal of a Portion of a Bid. The CAISO may remove part of a Bid, but retain other parts of the Bid for the applicable CAISO Market run and interval for the same or a different product, and may retain parts of the Bid for subsequent CAISO Market runs or intervals.

(c) Removal of a Bid Pursuant to Section 7.7.6(a)(2). If a particular Energy or Ancillary Service Bid must be removed pursuant to Section 7.7.6(a)(2)~~15.2.1~~, the CAISO will remove the entire Bid for that particular service and market.

(d) Resubmittal of Bids. The Scheduling Coordinator may resubmit removed Bids in subsequent CAISO Markets, provided the Scheduling Coordinator complies with any operator instructions regarding the subject Bids.

(e) RUC Bids. In the event the CAISO removes a Bid ~~is removed~~ from an IFM run, the RUC Availability Bid associated with the removed IFM Bid may still be accepted for the corresponding RUC run, unless the CAISO determines that the RUC Availability Bid is ~~determined to be~~ the cause of the disruption. ~~A problematic Bid as described in Section 7.7.15.2.1 will typically be identified as infeasible prior to publication of the CAISO Market interval in which it is causing a problem, in which case to the extent practicable the CAISO may remove the Bid, execute the CAISO Market without the removed Bid, and publish a CAISO Market result for that interval. In some instances, a Bid may be able to clear through the IFM without causing an infeasibility issue, but then it may be necessary to remove the RUC Availability Bid associated with the IFM Bid for the corresponding RUC run due to infeasibility issues raised for the RUC run. In the Real-Time Market, for reasons discussed above, the CAISO may also be required to remove a Bid for a Non-Dynamic System Resource that normally would be accepted in the HASP, yet may be able to utilize and accept the Bid for the RTD and non-HASP RTUC runs of the Real-Time Market included within the same Scheduling Coordinator Bid submission.~~

(f) RTM Bids. If~~, for the reasons discussed above,~~ the CAISO ~~is required to~~ removes a Bid in the advisory RTUC or RTD runs ~~conducted for future intervals~~ during the Real-Time Market, the CAISO may still use the removed Bid ~~may still be used~~ in the binding runs of the Real-Time Market for the same interval if the problems previously experienced with the Bid do not arise.

(g) Energy Component of Ancillary Services Bids. ~~If an Ancillary Service Bid or Submission to Self-Provide Ancillary Services is removed from the IFM, the Scheduling~~

~~Coordinator may resubmit these components in the RTM provided the issues identified in the IFM have been resolved and the Bid or submission is otherwise consistent with the Ancillary Service bidding rules in the CAISO Tariff.~~ If the CAISO ~~is required to~~ removes an Ancillary Services Bid submitted to the Real-Time Market, the CAISO may retain the associated Energy Bid ~~submitted in association with the Ancillary Services Bid~~ for that CAISO Market run.

~~7.7.15.2.3~~

(h) Settlement Consequences of Removal of Bids

(1) Day-Ahead Market. In the event that a Bid is removed from the Day-Ahead Market, the Scheduling Coordinator whose Bid is removed will not be subject to Settlement for the Day-Ahead Market for the affected service. ~~The Scheduling Coordinator may then resubmit the Bid in the Real-Time Market for the same service and, to the extent the Bid is feasible and the issues identified have been resolved, it may be accepted in the Real-Time Market consistent with the CAISO Tariff requirements that apply to the Real-Time Market.~~

(2) Ancillary Services. In the case of Ancillary Services Bids, including Submissions to Self-Provide an Ancillary Service, that are removed from the Day-Ahead Market, the Scheduling Coordinator will not receive Settlement for the Ancillary Services in the Day-Ahead Market and will not receive an opportunity cost payment in the Day-Ahead Market for the offered service. ~~If the Bid is accepted in the Real-Time Market, the Scheduling Coordinator will be subject to Settlement based on the CAISO Market in which the Bid actually clears.~~

(3) Exceptional Dispatch. In the event that a Bid is removed from a CAISO Market run or interval, the CAISO may subsequently be required to issue an Exceptional Dispatch for the resource, in which case the Scheduling Coordinator will receive Exceptional Dispatch Settlement as provided in Section 11.5.6.

(4) Demand Bids. In the event that a Demand Bid is removed from the Day-Ahead Market, because no Demand Bids for load can be submitted in the Real-Time Market, Scheduling Coordinators for the load not cleared in the Day-Ahead Market will be settled as Uninstructed Imbalance Energy as provided in Section 11.5.2.

~~7.7.15.2.4~~

(i) Reporting to Affected Scheduling Coordinators. To the extent practicable, the CAISO will contact a Scheduling Coordinator's representative before removing a Bid and advise the representative of the issues encountered with the Bid~~. In the event that a Bid is removed, the Scheduling Coordinator's Bid will not be cleared through the specific CAISO Market from which it was removed. The CAISO will notify the Scheduling Coordinator~~ as soon as practicable, but no later than three (3) Business Days, after the applicable Bid was removed and will provide information specifying when its Bid was removed and the nature of the disruption.

7.7.8 Under Frequency Load Shedding (UFLS).

~~7.7.8.1~~ Each UDC's UDCOA with the CAISO and each MSS Agreement through which the MSS Operator ~~undertakes to the CAISO to~~agrees to comply with the provisions of the CAISO Tariff shall describe the UFLS program for that UDC or for that MSS.

7.7.9 Application of Administrative Prices and Use of Prior Market Results

(a) In General. To manage an imminent or actual System Emergency or to prevent, manage, or minimize the extent of a Market Disruption, the CAISO will apply prior market results in accordance with this Section 7.7.9.

(b) Day-Ahead Market.

(1) Market Results. In the case of a suspension of the Day-Ahead Market –

(A) the CAISO shall use the Day-Ahead Market market results (except for Virtual Awards), as applicable, from the previous day for the Day-Ahead Market if the CAISO determines, based on expected system conditions,

that using such market results will provide a reasonable profile of Schedules to meet the needs of the Real-Time;

(B) if the CAISO determines, based on expected system conditions, that using the Day-Ahead Market market results described in Section 7.7.9(b)(1)(A) will not reasonably meet the needs of the Real-Time, the CAISO may rely solely on the use of Exceptional Dispatch and other manual instructions and on the Real-Time Market market results, as applicable for pricing and Settlement purposes, except that notwithstanding Section 11.2.4, Congestion Revenue Rights will be settled using the hourly average of the 15-minute FMM prices for each hour of the Real-Time Market.

(2) Notification. In the event the CAISO has not published the Day-Ahead Market market results or determines it may suspend the Day-Ahead Market, it will notify Market Participants by 6:00 p.m., indicating whether the CAISO anticipates it will –

(i) publish the Day-Ahead Market market results, and if so, when;

(ii) use the previous day's Day-Ahead Market market results pursuant to Section 7.7.9(b)(1)(A); or

(iii) rely on the use of Exceptional Dispatch and other manual instructions and on the Real-Time Market market results pursuant to Section 7.7.9(b)(1)(B).

(c) Real-Time Market Not Suspended. In the case of a Market Disruption of the Real-Time Market when the Real-Time Market has not been suspended –

(1) if market results are unavailable for fewer than four (4) consecutive 15-minute FMM intervals, the CAISO shall use the FMM market results, as applicable, for the FMM interval immediately preceding the FMM interval(s) for which FMM market results are unavailable;

(2) if market results are unavailable for fewer than twelve (12) consecutive 5-minute Dispatch Intervals, the CAISO shall use the RTD market results, as applicable, for the Dispatch Interval immediately preceding the Dispatch Interval(s) for which market results are unavailable;

(3) if market results are unavailable for at least four (4) consecutive 15-minute FMM intervals and market results are available for the RTD during those FMM intervals, the CAISO shall use the average of RTD market results, as applicable, during each such FMM interval and use the market results as applicable from the prior intervals for which market results are unavailable as needed;

(4) if market results are unavailable for at least twelve (12) consecutive 5-minute Dispatch Intervals and market results are available for the FMM during those Dispatch Intervals, the CAISO shall use the FMM market results, as applicable, from the applicable FMM during the Dispatch Intervals;

(5) if market results are unavailable for at least four (4) consecutive 15-minute FMM intervals and market results are unavailable for the RTD during those FMM intervals, the CAISO shall use the Day-Ahead Market market results, as applicable, for the corresponding Trading Hour for which market results are unavailable; and

(6) if market results are unavailable for at least twelve (12) consecutive 5-minute Dispatch Intervals and market results are unavailable for the FMM during those Dispatch Intervals, the CAISO shall use the previous day's Day-Ahead Market market results, as applicable, for the corresponding Trading Hour for which market results are unavailable.

(d) Real-Time Market Suspended. In circumstances where the Real-Time Market has been suspended, the CAISO shall use the previous day's Day-Ahead Market market results, as applicable, for the Trading Hour corresponding to the Trading Hour during which the Real-Time Market has been suspended.

(e) Default Provision. In circumstances that are not described in subsections (a) through (d) of this section or if the market results are for any reason unavailable, the CAISO shall use market results, as applicable, from the most recent preceding applicable interval that produced acceptable market results.

~~**7.7.15.3 Choices of Action to Prevent a Market Disruption, in the Event of a Market Disruption, or to minimize the Extent of a Market Disruption**~~

~~The CAISO's choice of action in the event of a Market Disruption shall depend on the CAISO Market that is disrupted, the cause of the Market Disruption, the expected time to resolve the Market Disruption, and the status of submitted Bids and Self-Schedules at the time the Market Disruption occurs. Nothing in this Section 7.7.15 shall prevent the CAISO from taking any other action permitted under the CAISO Tariff.~~

~~**7.7.15.4 Reporting Requirements under Section 7.7.15**~~

~~The CAISO shall include reports on actions taken pursuant to Section 7.7.15 in the Exceptional Dispatch report provided in Section 34.9.4 of the CAISO Tariff. The report shall detail the frequency and types of actions taken by the CAISO pursuant to this Section 7.7.15, as well as the nature of the specific Market Disruptions that caused the CAISO to take action and the CAISO rationale for taking such actions, or the Market Disruption that was successfully prevented or minimized by the CAISO as a result of taking action pursuant to its authority under Section 7.7.15. This informational filing shall also contain general information on the Bids removed pursuant to Section 7.7.15, which may include the megawatt quantity, point of interconnection, specification of the Day-Ahead versus Real-Time Bid, and Energy or Ancillary Services Bid, and the CAISO's rationale for removal; provided, however, that any Scheduling Coordinator-specific individual Bid information will be submitted on a confidential basis consistent with FERC's rules and regulations governing requests for confidential treatment of commercially sensitive information.~~

7.7.10 ~~[NOT USED]~~ CAISO Facility and Equipment Outages

(a) CAISO's Secure Communication System Unavailable

(1) Unavailable Critical Functions. During a total disruption of the CAISO's secure communication system –

(A) the CAISO's scheduling infrastructure computer systems will not be able to communicate with Scheduling Coordinators to receive any type of updated Bid or Schedule information;

(B) the CAISO's scheduling infrastructure computer systems will not be able to communicate Congestion Management information and Schedule changes to the Scheduling Coordinators; and

(C) the CAISO will not be able to communicate general information, including emergency information, to any Market Participants.

(2) Communications. During any period that the CAISO's secure communication system is unavailable, the CAISO shall –

(A) make all reasonable efforts to keep Market Participants aware of current CAISO Controlled Grid status using voice communications;

(B) use the most recent set of Day-Ahead Schedules, RUC Schedules, AS Awards, FMM Schedules, and Dispatch Instructions for each Scheduling Coordinator for the current and all future Settlement Periods and/or Trading Days until the CAISO's secure communication system is restored; and

(C) attempt to take critical Bids, including ETC and TOR Self-Schedules changes, from Scheduling Coordinators via voice communications as time and personnel availability allow.

(b) Primary CAISO Control Center Unavailability.

(1) Loss of all Voice Communications. In the event of loss of all voice communication at the Primary CAISO Control Center –

(A) the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center of the loss of voice communications;

(B) the Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system;

(C) additional voice notifications will be made as time permits; and

(D) once voice communications have been restored to the Primary CAISO Control Center, the CAISO will post this information on the CAISO's secure communication system.

(2) Complete Unavailability. In the event that the Primary CAISO Control Center becomes completely unavailable –

(A) the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center that the Primary CAISO Control Center is unavailable;

(B) the Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system;

(C) additional voice notifications will be made as time permits;

(D) the Backup CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid.

(E) the Backup CAISO Control Center will notify the Participating Transmission Owners by direct voice communication of the situation; and.

(F) once the Primary CAISO Control Center is again available, all functions will be transferred back, and the Primary CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

(3) CAISO Energy Management System (EMS) Unavailable. Should an outage occur to the redundant EMS computer systems in the Primary CAISO Control Center –

(A) EMS operation will transfer to the redundant EMS back up computers at the Backup CAISO Control Center;

(B) the Primary CAISO Control Center will post information on the CAISO's secure communication system that the Primary CAISO Control Center EMS computer is unavailable and that EMS control has been transferred to the Backup CAISO Control Center; and

(C) when the Primary CAISO Control Center EMS computer is restored, the Backup CAISO Control Center will initiate a transfer of the EMS system back to the Primary CAISO Control Center and the Primary CAISO Control Center will post information on the status of the restored EMS computer system on the CAISO's secure communication system.

(c) Backup CAISO Control Center.

(1) Loss of all Voice Communications. In the event of a loss of all voice communications at the Backup CAISO Control Center –

(A) the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center of the loss of voice communications;

(B) the Primary CAISO Control Center will post information on the situation via the CAISO's secure communication system;

(C) additional voice notifications will be made as time permits; and

(D) once voice communications have been restored to the Backup CAISO Control Center, the Primary CAISO Control Center will post this information on the CAISO's secure communication system.

(2) Control Center Completely Unavailable. In the event that the Backup CAISO Control Center becomes completely unavailable –

(A) the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center that the Backup CAISO Control Center is unavailable;

(B) the Primary CAISO Control Center will post information on the situation on the CAISO's secure communication system;

(C) additional voice notifications will be made as time permits;

(D) the Primary CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid;

(E) the Primary CAISO Control Center will notify the Participating Transmission Owners by direct voice communications of the situation; and

(F) once the Backup CAISO Control Center is again available, the Primary CAISO Control Center will transfer all functions back to the Backup CAISO Control Center, and the Backup CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

* * * *

11.5.6.1 Settlement for FMM or RTD IIE from Exceptional Dispatches used for System Emergency Conditions, for a Market Disruption~~Interruption~~, to Mitigate Overgeneration Conditions or to Prevent or Relieve Imminent System Emergencies

The Exceptional Dispatch Settlement price for incremental FMM or RTD IIE that is delivered as a result of an Exceptional Dispatch for System Emergency conditions, for a Market Disruption~~Interruption~~, to mitigate Overgeneration conditions, or to prevent or relieve an imminent System Emergency, including forced Start-Ups and Shut-Downs, is the higher of the (a) applicable FMM or RTD LMP, (b) the Energy Bid price, (c) the Default Energy Bid price if the resource has been mitigated through the MPM in the Real-Time Market and for the Energy that does not have an Energy Bid price, or (d) the negotiated price as applicable to System Resources. Costs for incremental Energy for this type of Exceptional Dispatch are settled in two payments: (1) incremental Energy is first settled at the applicable FMM or RTD LMP and included in the total IIE Settlement Amount described in Section 11.5.1.1; and (2) the incremental Energy Bid Cost in excess of the applicable FMM or RTD LMP at the relevant Location is settled pursuant to Section 11.5.6.1.1. The Exceptional Dispatch Settlement price for decremental IIE that is delivered as a result of an Exceptional Dispatch Instruction for a Market Disruption~~Interruption~~, or to prevent or relieve a

System Emergency, is the minimum of (a) the FMM or RTD LMP, (b) the Energy Bid price subject to Section 39.6.1.4, (c) the Default Energy Bid price if the resource has been mitigated through the MPM in the Real-Time Market and for the Energy that does not have an Energy Bid price, or (d) the negotiated price as applicable to System Resources. All Energy costs for decremental IIE associated with this type of Exceptional Dispatch are included in the total IIE Settlement Amount described in Section 11.5.1.1.

11.5.6.1.1 Settlement of Excess Cost Payments for Exceptional Dispatches used for System Emergency Conditions, for a Market Disruption~~Interruption~~, and to Avoid an Imminent System Emergency

The Excess Cost Payment for incremental Exceptional Dispatches used for emergency conditions, for a Market Disruption~~Interruption~~, or to avoid an imminent System Emergency is calculated for each resource for each Settlement Interval as the cost difference between the Settlement amount calculated pursuant to Section 11.5.6.1 for the applicable Exceptional Dispatch at the FMM or RTD LMP and delivered Exceptional Dispatch quantity at one of the following three costs: (1) the resource's Energy Bid Cost, (2) the Default Energy Bid cost, or (3) the Energy cost at the negotiated price, as applicable for System Resources, for the relevant Exceptional Dispatch.

* * * *

11.5.6.2.5.2 Allocation of Exceptional Dispatch Costs to Scheduling Coordinators

Excess Cost Payments for the Exceptional Dispatches used for emergency conditions and to avoid Market Disruption~~Interruption~~ and System Emergencies as determined pursuant to Section 11.5.6.1.1 shall be charged to Scheduling Coordinators as follows in a two-step process. First, each Scheduling Coordinator's charge shall be the lesser of:

(i) the pro rata share of total Excess Cost Payment based upon the ratio of each Scheduling Coordinator's Net Negative Uninstructed Deviations to the total system Net Negative Uninstructed Deviations; or

(ii) the amount obtained by multiplying the Scheduling Coordinator's Net Negative Uninstructed Deviation for each Settlement Interval and a weighted average price. The weighted average price is equal to the total Excess Cost Payments to be allocated divided by the MWh of Exceptional Dispatch Energy associated with the Excess Cost Payment.

Second, any remaining unallocated costs shall be allocated to all Scheduling Coordinators pro-rata based on their Measured Demand. For a Scheduling Coordinator of an MSS Operator that has elected to follow Load, allocation of this second category of Excess Cost Payments will be based on net metered MSS Demand. In addition, to the extent the Exceptional Dispatches are made to resolve congestion internal to the MSS, the Scheduling Coordinator for such an MSS will also be subject to these two categories of Excess Cost Payments.

A Scheduling Coordinator shall be exempt from the first category of the Excess Cost Payment allocation for a Settlement Interval if the Scheduling Coordinator has sufficient incremental Energy Bids from physically available resources in the Real-Time Market for Energy to cover its Net Negative Uninstructed Deviation in the given Settlement Interval and the prices of such Energy Bids do not exceed the applicable maximum Bid level as set forth in Section 39.

* * * *

11.5.8.1 Settlement for Energy Purchased by the CAISO for System Emergency Conditions, to Avoid Market Disruption~~Interruption~~, or to Prevent or Relieve Imminent System Emergencies, Other than Exceptional Dispatch Energy

The Settlement price for Energy that is delivered to the CAISO from a utility in another Balancing Authority Area as a result of a CAISO request pursuant to Section 42.1.5 or any other provision for assistance in System Emergency conditions, to avoid a Market Disruption~~Interruption~~, or to prevent or relieve an imminent System Emergency, other than Energy from an Exceptional Dispatch, shall be either (i) a negotiated price agreed upon by the CAISO and the seller or (ii) a price established by the seller for such emergency assistance in advance, as may be applicable. In the event no Settlement price is established prior to the delivery of the emergency Energy, the default Settlement price shall be the simple average of the relevant FMM and RTD LMPs at the applicable Scheduling Point, plus all other charges applicable to imports to the CAISO Balancing Authority Area, as specified in the CAISO Tariff. If the default Settlement price is determined by the seller not to compensate the seller for the value of the emergency Energy delivered to the CAISO, then the seller shall have the opportunity to provide the CAISO with cost support information demonstrating that a higher price is justified. The cost support information must be provided in writing to the CAISO within thirty (30) days following the date of the provision of emergency assistance. The CAISO shall have the discretion to pay that higher price based

on the seller's justification of this higher price. The CAISO will provide notice of its determination whether to pay such a higher price within thirty (30) days after receipt of the cost support information. Any dispute regarding the CAISO's determination whether to pay a higher price for emergency assistance based on cost support information shall be subject to the CAISO ADR Procedures. Payment by the CAISO for such emergency assistance will be made in accordance with the Settlement process, billing cycle, and payment timeline set forth in the CAISO Tariff. The costs for such emergency assistance, including the payment of a price based on cost support information, will be settled in two payments: (1) the costs will first be settled at the simple average of the relevant Dispatch Interval LMPs and included in the total IIE Settlement Amount as described in Section 11.5.2.1; and (2) costs in excess of the simple average of the relevant Dispatch Interval LMPs plus other applicable charges will be settled in accordance with Section 11.5.8.1.1. The allocation of the amounts settled in accordance with Section 11.5.1.1 will be settled according to Section 11.5.4.2.

* * * *

14. Uncontrollable Force ~~Majeure~~, Indemnity, Liabilities, and Penalties

14.1 Uncontrollable Forces

Neither the CAISO nor a Market Participant will be considered in default of any obligation under this CAISO Tariff if prevented from fulfilling that obligation due to the occurrence of an Uncontrollable Force. The physical inability of a Market Participant to perform in accordance with a Day-Ahead Schedule or Ancillary Service Award for any reason shall not relieve the Market Participant from its financial obligations under Section 11 that result from the failure to perform.

* * * *

16.3 ~~[NOT USED]~~ Curtailment Under Emergency And Non-Emergency Conditions

16.3.1 Emergency Conditions

To the extent practicable, the CAISO shall allocate necessary curtailments of Existing Rights or non-Converted Rights under emergency conditions in accordance with the TRTC Instructions submitted by the Responsible PTO pursuant to Section 16.4. If circumstances prevent the CAISO's compliance with such TRTC Instructions, the CAISO shall allocate such curtailments in a non-discriminatory manner consistent with Good Utility Practice and Applicable Reliability Criteria.

16.3.2 Non-Emergency Conditions

Unless otherwise specified by the Responsible PTO in the TRTC Instructions that it submits to the CAISO pursuant to Section 16.4, the CAISO will allocate any necessary curtailments under non-emergency conditions, pro rata, among holders of Existing Rights, at particular Scheduling Points and/or on particular contract paths, in the order of: (1) non-firm, (2) each priority of conditional firm, and (3) each priority of firm rights. Priorities for firm and conditional firm transmission service are indicated using the TRTC Instructions as described in Section 16.4.

* * * *

29.7 EIM Operations Under Normal And Emergency Conditions.

* * * *

(j) **EIM Disruption.**

(1) **Declaration.** The CAISO may declare an interruption of EIM Entity participation in the Real-Time Market when in its judgment—

(A) operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO Market Disruption) in the EIM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria; or

(B) communications between the CAISO and EIM Market Participants are disrupted and prevent an EIM Entity, EIM Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information.

(2) **CAISO Response to EIM Disruption.** If the CAISO declares an interruption of EIM Entity participation in the Real-Time Market, the CAISO may in its judgment, among other things—

(A) separate the affected EIM Entity Balancing Authority Area from the EIM Area and maintain the Real-Time Market for other Balancing Authority Areas in the EIM Area by enforcing a net transfer constraint for the affected Balancing Authority Area to separate it from the remainder of the EIM Area;

(B) reduce or suspend EIM Transfers between one or more Balancing Authority Areas in the EIM Area;

(C) instruct one or more EIM Entities to maintain system balance within their Balancing Authority Area without RTM Dispatch; or

(D) in addition or as an alternative, use market results ~~establish an Administrative Price~~ in the Real-Time Market in accordance with Section 7.7.4~~9~~ or take any of the actions specified in Section 7.7.~~15~~6 with respect to the Real-Time Market~~.~~, except that if Section 7.7.9 calls for the use of Day-Ahead Market results, the CAISO will use –

(i) the price specified in the EIM Entity's open access transmission tariff as the LMP;

(ii) the EIM Entity's EIM Base Schedule as the schedule;

(iii) the EIM Bid Adder from the most recent corresponding interval that is available as the EIM Bid Adder; and

(iv) the emissions rate set by the California Air Resources Board for an unspecified source multiplied by the daily Greenhouse Gas Allowance Price.

(3) **EIM Entity Responsibility.** In response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO, all EIM Entities shall follow NERC Reliability Standards applicable to their roles as Balancing Authorities in an effort to alleviate operational and system conditions and restore routine operations.

(4) **EIM Entity Scheduling Coordinator Responsibility.** All EIM Entity Scheduling

Coordinators shall promptly inform the CAISO of actions taken by the EIM Entities they represent in response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO through updates to their EIM Base Schedules, Interchange E-Tags, transmission limit adjustments, or Outage and derate information, as applicable.

(5) **System Restoration.** The CAISO shall reinstate normal operation of the Real-Time Market in the EIM Area at such time as it determines that the conditions that caused the interruption of EIM Entity participation in the Real-Time Market have been resolved.

* * * *

- Administrative Price

The market results determined according to Section 7.7.9.~~The price set by the CAISO in place of a Locational Marginal Price when, by reason of a System Emergency, the CAISO determines that it no longer has the ability to maintain reliable operation of the CAISO Controlled Grid relying solely on the economic Dispatch of Generation. This price will remain in effect until the CAISO considers that the System Emergency has been contained and corrected.~~

* * * *

- ~~Alert, Warning Or~~ Emergency ~~(AWE)~~ Notice

An electronic notice issued by the CAISO regarding a System Emergency as set forth in the Business Practice Manual.~~A CAISO operations communication issued to Market Participants and the public, under circumstances and in a form specified in CAISO Operating Procedures, when the operating requirements of the CAISO Controlled Grid are marginal because of Demand exceeding forecast, loss of major Generation sources, or loss of transmission capacity that has curtailed imports into the CAISO Balancing Authority Area, or if insufficient Bids for the Supply of Energy and Ancillary Services have been submitted in the RTM for the CAISO Balancing Authority Area.~~

* * * *

- Backup CAISO Control Center

The alternate CAISO Control Center. ~~located in Alhambra, California.~~

* * * *

- Excess Cost Payments

The payments made by the CAISO for costs associated with Exceptional Dispatches for 1) emergency conditions, to avoid Market Disruption~~Interruption~~ and avoid an imminent System Emergency as provided in Section 11.5.6.1.1; 2) transmission-related modeling limitations as provided in Section 11.5.6.2.3; 3) Condition 2 RMR Units as provided in Section 11.5.6.3.2; and 4) emergency Energy as provided in Section 11.5.8.1.1.

* * * *

~~**- Force Majeure**~~

~~Force Majeure" shall mean any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's control. A Force Majeure event does not include acts of negligence or intentional wrongdoing by the Party claiming Force Majeure.~~

* * * *

- Market Disruption

An action or event that causes a failure of a CAISO Market, related to system operation issues or System Emergencies referred to in Sections 7.6, ~~and~~ 7.7, and 34.10, including actions taken by the CAISO to prevent, manage, or minimize the extent of a Market Disruption.~~respectively.~~

* * * *

~~**- Market Interruption**~~

~~Actions taken by the CAISO outside of the normal market operation of any of the CAISO Markets in the event of a Market Disruption, to prevent a Market Disruption, or minimize the extent of a Market Disruption as provided in Sections 7.7.15 and 34.9.~~

* * * *

- Primary CAISO Control Center

The CAISO Control Center ~~located in Folsom, California~~.

Attachment C – Marked Tariff Language Showing Reasons For Revisions

Tariff Amendment to Implement Administrative Pricing Policy and Tariff Clarifications
California Independent System Operator Corporation

November 23, 2016

[NOTE: Bracketed remarks in yellow highlight indicate reasons for revisions; Plain text in green indicates underlying language moved from another section.]

7.7 Management Of Abnormal System Conditions~~System Emergencies~~

7.7.1 [Tariff sections 7.7.1(a)-(e) revised to include streamlined and clarified language from current tariff sections 7.7.1, 7.7.2, and 7.7.2.1] CAISO Actions in Imminent or Actual System Emergency

(a) Declaration of System Emergency. When, in the judgment of the CAISO, a System Emergency has occurred or is imminent, ~~the System Reliability of the CAISO Controlled Grid is in danger of instability, voltage collapse or under-frequency caused by transmission or Generation trouble in the CAISO Balancing Authority Area, or events outside of the CAISO Balancing Authority Area that could result in a cascade of events throughout the WECC grid,~~ the CAISO will declare a System Emergency and issue an Emergency Notice to that effect, setting forth the actions that the CAISO is taking to address the System Emergency.

(b) Subsequent Notices Regarding System Emergency. Each time that the CAISO initiates any of the actions in Section 7.7.1(c) in response to a System Emergency, and at such time that the CAISO terminates any such action or resolves the System Emergency, the CAISO will issue a subsequent Emergency Notice setting forth the action or determination.

(c) Actions in Response to System Emergency. ~~This declaration may include a notice to~~ In response to a System Emergency, the CAISO may take any or all of the following actions as necessary to preserve or restore reliable, safe, and efficient service as quickly as reasonably practicable:

(1) suspend the CAISO ~~Day-Ahead and Real-Time~~ Markets and apply an Administrative Price in accordance with Section 7.7.3;~~,~~

(2) authorize full use of Black Start Generating Units;~~,~~

(3) initiate full control of manual Load Shedding, in accordance with Section 7.7.3(c);~~and~~

(4) authorize the curtailment of Curtailable Demand (even though not scheduled as an Ancillary Service) in accordance with Section 7.7.3(c); and~~.~~

(5) take such other action that it considers necessary to preserve or restore stable operation of the CAISO Controlled Grid, to the extent such actions are consistent with Good Utility Practice and Applicable Reliability Criteria and not inconsistent with the CAISO Tariff.

(d) Termination of System Emergency. The CAISO will terminate~~reduce~~ the System Emergency and suspend the actions taken in response to the System Emergency when it determines~~declaration to a lower alert status when it is satisfied~~, after conferring, as necessary, with Reliability Coordinators within the WECC, that the major ~~contributing~~factors contributing to the System Emergency have been corrected, and all involuntarily interrupted Demand is back in service (except interrupted Curtailable Demand selected as an Ancillary Service). ~~This reduction in alert status will reinstate the competitive markets if they have been suspended.~~

~~**7.7.2 Emergency Procedures**~~

~~In the event of a System Emergency, the CAISO shall take such action as it considers necessary to preserve or restore stable operation of the CAISO Controlled Grid. The CAISO shall act in accordance with Good Utility Practice to preserve or restore reliable, safe and efficient service as quickly as reasonably practicable.~~

(e) Coordination with Neighboring Balancing Authority Areas. The CAISO shall keep system operators in adjacent Balancing Authority Areas informed, as necessary, as to the nature and extent of the System Emergency in accordance with WECC procedures. ~~and, where practicable, shall additionally keep the Market Participants within the Balancing Authority Area informed.~~

(f) [Tariff language moved from current tariff section 7.7.5 moved to more logical location – this new tariff section 7.7.1(f) – and streamlined and clarified]

Emergency Guidelines. The CAISO shall issue guidelines for all Market Participants to follow during a System Emergency~~. These guidelines shall be~~ consistent with the

responsibilities set forth ~~specific obligations of Scheduling Coordinators and Market Participants referenced~~ in Section~~s 7.7.10, 7.7.11,~~ 7.7.2 and in applicable Operating Procedures.~~, 7.7.2.3 and 7.7.4(1).~~

~~**7.7.2.1 Declarations of System Emergencies**~~

~~The CAISO shall, when it considers that conditions giving rise to a System Emergency exist, declare the existence of such System Emergency. A declaration by the CAISO of a System Emergency shall be binding on all Market Participants until the CAISO announces that the System Emergency no longer exists.~~

7.7.2 Market Participant Responsibilities in System Emergencies.

(a) [Tariff language moved from current tariff section 7.7.5 to more logical location – this new tariff section 7.7.2(a) – and streamlined and clarified] Response to CAISO Dispatch Instructions. All Market Participants shall respond immediately to CAISO Dispatch Instructions ~~with an immediate response~~ during System Emergencies.

~~**7.7.2.2**~~ **(b) [Tariff sections 7.7.2(b)(1)-(2) revised to include streamlined and clarified language from current tariff section 7.7.2.2] Responsibilities of UDCs and MSS~~s~~ Operators During a System Emergency**

(1) Compliance with Directions and Procedures. In the event of a System Emergency, UDCs and MSS Operators shall comply with all directions from the CAISO concerning the avoidance, management, and alleviation of the System Emergency and shall comply with all procedures concerning System Emergencies set forth~~out~~ in this CAISO Tariff, the Business Practice Manuals, and the Operating Procedures.~~, and each MSS Operator shall comply with all directions from the CAISO concerning the avoidance, management and alleviation of the System Emergency and shall comply with all procedures concerning System Emergencies set forth in the CAISO Tariff, Business Practice Manuals and Operating Procedures.~~

(2) Communications. During a System Emergency, the CAISO ~~and UDCs~~ shall communicate with the UDCs and MSS Operators through their respective control

centers and in accordance with procedures established in individual UDC and MSS Operating Agreements~~, and the CAISO and the MSS Operator shall communicate through their respective control centers and in accordance with procedures established in the MSS Agreement~~.

(3) [Tariff language moved current tariff section 7.7.5.2 to more logical location, this new tariff section 7.7.2(b)(3)] Notifications of End-Use Customers. Each UDC and MSS Operator will notify its End-Use Customers connected to the UDC's or the MSS's Distribution System of any voluntary curtailments notified to the UDC or to the MSS Operator by the CAISO pursuant to the provisions of the Electrical Emergency Plan.

~~7.7.2.3~~ **(c) [This tariff section 7.7.2(c) revised to clarify and streamline language from current tariff section 7.7.2.3 and to provide a more logical location for language from current tariff section as discussed below] Responsibilities of Generating Units, System Units, and System Resources During System Emergencies**

(1) In General. All Generating Units and System Units that are owned or controlled by a Participating Generator are (without limitation to the CAISO's other rights under this CAISO Tariff) subject to control by the CAISO during a System Emergency and ~~in circumstances in which the CAISO considers that a System Emergency is imminent or threatened. T~~the CAISO shall~~, subject to this Section 7,~~ have the authority to instruct a Participating Generator to bring its Generating Unit on-line~~,~~ or off-line~~,~~ or to increase or curtail the output of the Generating Unit and to alter scheduled deliveries of Energy and Ancillary Services into or out of the CAISO Controlled Grid, if such an instruction is reasonably necessary to prevent an imminent or threatened System Emergency or to retain Operational Control over the CAISO Controlled Grid during an actual System Emergency.

(2) [Tariff language moved from current tariff section 7.7.4(1) to more logical location – this new tariff section 7.7.2(c)(2) – and clarified] Prerequisite for Dispatch Instructions. The CAISO shall, where reasonably practicable, use Ancillary Services which it has the contractual right to instruct and which are

capable of contributing to containing or correcting the actual, imminent, or threatened System Emergency prior to issuing instructions to a Participating Generator under this subsection, except that the CAISO need not take such action if it determines such action is unlikely to be effective.

(3) RMR Condition 2 Units.

(A) Prerequisite for Dispatch Instructions. The CAISO shall only ~~have the authority to~~ instruct an RMR Unit whose owner has selected Condition 2 of its RMR Contract to start-up and change its output if the CAISO has reasonably used all other available and effective resources to prevent a threatened System Emergency without declaring that a System Emergency exists.

(B) Compensation. If the CAISO dispatches ~~so instructs~~ a Condition 2 RMR Unit pursuant to subparagraph (A), it shall compensate that unit in accordance with Section 11.5.6.3 and allocate the costs in accordance with Section 11.5.6.3.2.

(4) Qualifying Facilities. A Scheduling Coordinator that represents a ~~Each~~ QF subject to an Existing QF Contract that is ~~and~~ not subject to a PGA or Net Scheduled PGA will make reasonable efforts to require such QFs to comply with the CAISO's instructions during a System Emergency without penalty for failure to do so.

[Current tariff section 7.7.3 deleted and details concerning the notices will be moved to a business practice manual]

~~**7.7.3 Notifications By CAISO Of System Conditions**~~

~~The CAISO will provide the following notifications to Market Participants to communicate unusual system conditions or emergencies.~~

~~**7.7.3.1 System Alert**~~

~~CAISO will give an AWE Notice of a system alert when the operating requirements of the CAISO Controlled Grid are marginal because of Demand exceeding forecast, loss of major Generation or loss of~~

~~transmission capacity that has curtailed imports into the CAISO Balancing Authority Area, or if it otherwise appears that there is insufficient Energy and Ancillary Services to meet Real-Time Demand in the CAISO Balancing Authority Area.~~

~~**7.7.3.2 System Warning**~~

~~The CAISO will give an AWE Notice of a system warning when the operating requirements for the CAISO Controlled Grid are not being met in the Real-Time Market, or the quantity of Regulation, Spinning Reserve, Non-Spinning Reserve, and Energy available to the CAISO is not acceptable for the Applicable Reliability Criteria. This system warning notice will notify Market Participants that the CAISO will, acting in accordance with Good Utility Practice, take such steps as it considers necessary to ensure compliance with Applicable Reliability Criteria, including the negotiation of commitments for Generation through processes other than competitive Bids.~~

7.7.3~~7.7.4~~ [This tariff section 7.7.3 revised to clarify and streamline language from current tariff section 7.7.4, to be consistent with the administrative pricing changes in revised tariff section 7.7.9, and to provide more logical locations for language from current tariff sections as discussed below] Suspension of~~~~Intervention In~~ CAISO Market~~s~~ and Application of Administrative Price.~~Operations~~

(a) In General. In the absence of a Market Disruption, ~~T~~the CAISO may suspend~~intervene in the operation of~~ the CAISO Markets and apply ~~set the~~ Administrative Price~~s as provided in Section 7.7.9~~, if the CAISO determines that such suspension~~intervention~~ is necessary in order to prevent, contain, or correct a System Emergency in accordance with this Section 7.7.3~~as follows~~.

(b) Suspension of DAM.

(1) **Condition for Suspension.** The CAISO will not suspend~~intervene in~~ the operation of the Day-Ahead Market to manage a System Emergency unless there has been a total or major collapse of all or part of the CAISO Controlled Grid and the CAISO is in the process of restoring it or if the CAISO anticipates that it will not publish DAM results for any reason. **[Tariff language moved from current tariff section 7.7.4(1) to more logical location – new tariff section 7.7.2(c)(2) – and clarified]** ~~The CAISO shall, where reasonably practicable, utilize Ancillary Services which it has the contractual right to instruct and which are capable of contributing to containing or correcting the actual, imminent or threatened System Emergency prior to issuing instructions to a Participating Generator under Section 7.7.2.3. In the event that the CAISO has exhausted all Economic Bids in the IFM, the CAISO shall use the scheduling priorities listed in Section 31.4 to clear the IFM.~~

(2) **[New tariff provision to implement administrative pricing change – see Pricing Enhancements Final Proposal at 12] Notification.** In the event the CAISO determines it may suspend the DAM, it will notify Market Participants as set forth in Section 7.7.9(b)(2).

(c) **Suspension of RTM.** Before suspending the RTM to prevent or manage a System Emergency,~~any such intervention~~ the CAISO ~~must (in the following order):~~ may take any or all of the following actions that it deems effective to mitigate the System Emergency –

(1)~~(a)~~ dispatch all reasonably effective Supply Bids offered or available to it regardless of price (including all Energy Bids and Ancillary Services Bids);

(2) **[Tariff language moved from current tariff section 7.7.11.1 to more logical location – this new tariff section 7.7.3(c)(2) – and streamlined and clarified]** ~~As an additional resource for managing System Emergencies, the CAISO will,~~ subject to Section 3, notify the UDCs when the conditions to implement their existing Load curtailment programs have been met in accordance with their terms;

(3) **[Tariff language moved from current tariff section 7.7.4(2)(c) to more logical location, this new tariff section 7.7.3(c)(3)]** dispatch or curtail all price-responsive Demand that has been bid into the Day-Ahead Market and exercise its rights under all Load curtailment contracts available to it;

(4) **[Tariff language moved from current tariff section 7.7.11.2 to more logical location – this new tariff section 7.7.3(c)(4) – and streamlined and clarified]** ~~The CAISO,~~ at its discretion, ~~may~~ require direct control over ~~such~~ Curtailable Demand; ~~to assume response capability for managing System Emergencies.~~

(5)~~(b)~~ dispatch all interruptible Loads made available by UDCs to the CAISO in accordance with the relevant agreements with UDCs; or **[Tariff language moved from current tariff section 7.7.4(2)(c) to more logical location, new tariff section 7.7.3(c)(3)]** ~~(c) dispatch or curtail all price-responsive Demand that has been bid into the Day-Ahead Market and exercise its rights under all Load curtailment contracts available to it;~~

(6) **[Tariff language moved from current tariff section 7.7.11.3 to more logical location – this new tariff section 7.7.3(c)(6) – and streamlined]** ~~The CAISO shall have the authority to~~ direct a UDC or an MSS Operator to disconnect load from the CAISO Controlled Grid ~~if necessary to avoid an anticipated System Emergency or to regain Operational Control over the CAISO Controlled Grid during an actual System Emergency. The CAISO shall direct the UDC or the MSS Operator to shed Load~~ in accordance with the prioritization schedule developed pursuant to Section 7.7.4(b)~~7.~~, and~~(d)~~ exercise Load Shedding to curtail Demand on an involuntary basis, to the extent that the CAISO considers necessary or as instructed by the Reliability Coordinator.

(d) **[Tariff language moved from current tariff section 7.7.11.4.3 to more logical location – this new tariff section 7.7.3(d)]** If a Load curtailment is required to manage System Emergencies, ~~in any circumstances other than those described in Section 7.7.11.4.2,~~ the CAISO will determine the amount and location of Load to be reduced and to the extent practicable, will allocate a portion to each UDC or MSS Operator based on the ratio of its Demand (at the time of the Balancing Authority Area annual peak for the previous year) to total Balancing Authority Area annual peak Demand for the previous year taking into account system considerations and the UDC's or MSS Operator's curtailment rights under their tariffs. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruption.

~~(3) The Administrative Price in relation to each of the markets for Imbalance Energy and Ancillary Services shall be set at the applicable price in the Settlement Period immediately preceding the Settlement Period in which the intervention took place.~~

(e)~~(4)~~ **Termination of Market Suspension.** The suspension~~intervention~~ will cease as soon as conditions allow.~~the CAISO has restored all Demand that was curtailed on an involuntary basis.~~

~~**7.7.5 Emergency Guidelines**~~

[Tariff language from this current tariff section 7.7.5 moved to more logical locations in new tariff sections 7.7.1(f) and 7.7.2(a) and streamlined and clarified]~~The CAISO shall issue guidelines for all Market Participants to follow during a System Emergency. These guidelines shall be consistent with the specific obligations of Scheduling Coordinators and Market Participants referenced in Sections 7.7.10, 7.7.11, 7.7.2, 7.7.2.3 and 7.7.4(1). All Market Participants shall respond to CAISO Dispatch Instructions with an immediate response during System Emergencies.~~

[This current tariff section 7.7.5.1 deleted as unnecessary] ~~**7.7.5.1** The CAISO shall in accordance with this Section 7.7.5 implement the Electrical Emergency Plan in consultation with the UDCs, the MSS~~

~~Operators, or other entities, at the CAISO's discretion, when Energy reserve margins are forecast to be at the levels specified in the plan.~~

[Tariff language moved from this current tariff section 7.7.5.2 to more logical location in new tariff section 7.7.2(b)(3)] ~~**7.7.5.2** Each UDC and MSS Operator will notify its End-Use Customers connected to the UDC's or the MSS's Distribution System of any voluntary curtailments notified to the UDC or to the MSS Operator by the CAISO pursuant to the provisions of the EEP.~~

7.7.4~~**7.7.6**~~ **[This tariff section 7.7.4 revised to clarify and streamline language from current tariff section 7.7.6] Preparatory Actions for a System Emergency**

(a) **Periodic Tests Of Emergency Procedures.** The CAISO shall develop and administer periodic ~~unannounced~~ tests of System Emergency procedures~~. Such tests shall be~~ designed to ensure that the CAISO Market Participants are capable of promptly and efficiently responding to imminent or actual System Emergencies.

~~7.7.7~~ (b) **Prioritization Schedule For Shedding And Restoring Load.** On an annual basis, the CAISO ~~shall, in~~ will, in collaboration ~~consultation~~ with UDCs and MSS~~Market Participants~~ and subject to the provisions of Section 3, develop a prioritization schedule for Load Shedding should a System Emergency require such action, which~~. The prioritization schedule~~ shall also establish a sequence for the restoration of Load in the event that multiple UDCs or MSS~~Scheduling Coordinators or Market Participants~~ are affected by service interruptions and Load must be restored in blocks. ~~For Load shed in accordance with Section 7.7.11.4.2, the prioritization schedule will only include those UDCs or MSS Operators that have Scheduling Coordinators that have failed to submit Bids with sufficient resources to meet the Load in the UDC or MSS Service Area. For Load shed in accordance with Section 7.7.11.4.3, the prioritization schedule will include all UDCs and MSS Operators.~~

~~**7.7.9 [NOT USED]**~~

[This current tariff section 7.7.10 deleted as unnecessary]

~~**7.7.10 Further Obligations Relating To System Emergencies**~~

~~The CAISO and Participating TOs shall comply with their obligations in Section 9 of the TCA.~~

~~7.7.11 Use Of Load Curtailment Programs~~

~~7.7.11.1 Use of UDC's Existing Load Curtailment Programs~~

[Tariff language moved from this current tariff section 7.7.11.1 to more logical location – new tariff section 7.7.3(c)(2) – and streamlined and clarified]~~As an additional resource for managing System Emergencies, the CAISO will, subject to Section 3, notify the UDCs when the conditions to implement their Load curtailment programs have been met in accordance with their terms. The UDCs will exercise their best efforts, including seeking any necessary regulatory approvals, to enable the CAISO to rely on their curtailment rights at specified levels of Operating Reserve. Each UDC shall by not later than October 1 of each year advise the CAISO of the capabilities of its Load curtailment programs for the forthcoming year, and the conditions under which those capabilities may be exercised, and shall give the CAISO as much notice as reasonably practicable of any change to such programs.~~

~~7.7.11.2 Load Curtailment~~

[Tariff language moved from this current tariff section 7.7.11.2 to more logical location – new tariff section 7.7.3(c)(2) – and streamlined and clarified] ~~A Scheduling Coordinator may specify that Loads will be reduced at specified prices or, pursuant to a Participating Load Agreement, offer the right to exercise Load curtailment to the CAISO as an Ancillary Service or utilize Load curtailment itself (by way of self-provision of Ancillary Services) as Non-Spinning Reserve. The CAISO, at its discretion, may require direct control over such Curtailable Demand to assume response capability for managing System Emergencies. However, non-firm Loads shall not be eligible to provide Curtailable Demand if they are receiving incentives for interruption under existing programs approved by a Local Regulatory Authority, unless: a) participation in the CAISO's Ancillary Services markets is specifically authorized by such Local Regulatory Authority, and b) there exist no contingencies on the availability, nor any unmitigated incentives encouraging prior curtailment, of such interruptible Load for Dispatch as Curtailable Demand as a result of the operation of such existing program. The CAISO may establish standards for automatic communication of curtailment instructions to implement Load curtailment as a condition for accepting any offered Load curtailment as an Ancillary Service.~~

~~7.7.11.3~~ **[Tariff language moved from this current tariff section 7.7.11.3 to more logical location – new tariff section 7.7.3(c)(6) – and streamlined]**~~The CAISO shall have the authority to direct a UDC or~~

an MSS Operator to disconnect Load from the CAISO Controlled Grid if necessary to avoid an anticipated System Emergency or to regain Operational Control over the CAISO Controlled Grid during an actual System Emergency. The CAISO shall direct the UDC or the MSS Operator to shed Load in accordance with the prioritization schedule developed pursuant to Section 7.7.7. When CAISO Controlled Grid conditions permit restoration of Load, the CAISO shall restore Load according to the prioritization schedule developed pursuant to Section 7.7.7. The MSS Operator shall restore Load internal to the MSS.

[This current tariff section 7.7.11.4.2 is deleted as unnecessary in light of adoption of resource adequacy program and the ability of the CAISO to back stop RA shortfalls..]

7.7.11.4 Load Shedding

7.7.11.4.1 [NOT USED]

7.7.11.4.2 If the CAISO forecasts in advance of the RTM that Load curtailment will be necessary due to a resource deficiency as determined pursuant to Section 40.7, the CAISO will identify any UDC or MSS Service Area that is resource deficient. The CAISO will provide notice to all Scheduling Coordinators if one or more UDC or MSS is deficient. If Load curtailment is required to manage a System Emergency associated with a resource deficiency determined pursuant to Section 40.7, the CAISO will determine the amount and location of Load to be curtailed and will allocate a portion of that required Load curtailment to each UDC or MSS Operator whose Service Area has been identified as being resource-deficient based on the ratio of its resource deficiency to the total Balancing Authority Area resource deficiency. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruptions.

[Tariff language moved from this current tariff section 7.7.11.4.3 to more logical location – new tariff section 7.7.3(d)]

7.7.11.4.3 If a Load curtailment is required to manage System Emergencies, in any circumstances other than those described in Section 7.7.11.4.2, the CAISO will determine the amount and location of Load to be reduced and to the extent practicable, will allocate a portion to each UDC or MSS Operator based on the ratio of its Demand (at the time of the Balancing Authority Area annual peak for the previous year) to total Balancing Authority Area annual peak Demand for the previous year taking into account system

~~considerations and the UDC's or MSS Operator's curtailment rights under their tariffs. Each UDC or MSS Operator shall be responsible for notifying its customers and Generators connected to its system of curtailments and service interruption.~~

[Tariff language from this current tariff section 7.7.12 moved to more logical location – revised tariff section 16.3 – and clarified]

~~**7.7.12 Curtailment Under Emergency And Non-Emergency Conditions**~~

~~**7.7.12.1 Emergency Conditions**~~

~~To the extent practicable, the CAISO shall allocate necessary curtailments of Existing Rights or non-Converted Rights under emergency conditions in accordance with the instructions submitted by the Responsible PTO pursuant to Section 16. If circumstances prevent the CAISO's compliance with such instructions, the CAISO shall allocate such curtailments in a non-discriminatory manner consistent with Good Utility Practice.~~

~~**7.7.12.2 Non-Emergency Conditions**~~

~~Unless otherwise specified by the Responsible PTO in the instructions that it submits to the CAISO under Section 16, the CAISO will allocate any necessary curtailments under non-emergency conditions, pro rata, among holders of Existing Rights, at particular Scheduling Points and/or on particular contract paths, in the order of: (1) non-firm, (2) each priority of conditional firm, and (3) each priority of firm rights. Priorities for firm and conditional firm transmission service are indicated using the TRTC Instructions as described in Section 16.~~

7.7.5~~13~~ [This tariff section 7.7.5 revised to clarify and streamline language from current tariff section 7.7.13]Actions Subsequent to a System Emergency~~System Emergency Reports And Sanctions~~

~~**7.7.13.1**~~

(a) **Review of Major Outages.** The CAISO, with the cooperation of any affected UDC, shall jointly perform a review following a major Outage that affects at least ten (10) percent of the Load served by the Distribution System of a UDC or any Outage that results in major damage to the CAISO Controlled Grid or to the health and safety of personnel, which~~.~~ ~~The review~~ shall address the cause of the Outage, the response time and effectiveness of emergency management efforts, and whether the operation, maintenance, or

scheduling practices of the CAISO, any Participating TOs, Participating Generators, Eligible Customers, or UDCs ~~or Participating Generators~~ enhanced or undermined the ability of the CAISO to maintain or restore service efficiently and in a timely manner.

(b) Report. The CAISO shall prepare a report on all major outages described in subsection (a) and shall share the report with Participating TOs, Participating Generators, Eligible Customers, and UDCs.

~~**7.7.13.2 Provide Information to Review Outages**~~

(c) Provision of Information and Opportunity to Comment. ~~Participating TOs, Participating Generators, Eligible Customers, Scheduling Coordinators and UDCs shall promptly provide information requested by the CAISO to review Outages pursuant to Section 7.7.13.1 and to prepare Outage reports.~~ The CAISO shall seek the views of any ~~affected~~ Participating TOs, Participating Generators, Eligible Customers, UDCs, and Scheduling Coordinators ~~or UDCs~~ affected by a System Emergency in the preparation of a report under subsection (b), and such affected entities shall promptly provide information requested by the CAISO. The CAISO shall give ~~and allow~~ such affected entities ~~Participating TOs, Participating Generators, Eligible Customers, Scheduling Coordinators or UDCs~~ an opportunity to comment on any issues arising during the preparation of the ~~a~~ report. ~~All findings and reports arising from the CAISO's review shall be shared with Participating TOs, Participating Generators, Eligible Customers and UDCs.~~

~~**7.7.13.3 [NOT USED]**~~

[Tariff language from current tariff section 7.7.14 moved to revised tariff section 7.7.10 to reflect reorganization of tariff section 7.7 and streamline and clarify the language, and to remove reference to Folsom as location of control center and Alhambra as location of back-up control centers as unnecessary and in light of relocation of back-up control center]

~~**7.7.14 CAISO Facilities And Equipment**~~

~~**7.7.14.1 CAISO Facility and Equipment Outages**~~

~~The CAISO has installed redundant control centers, communication systems and computer systems. Most, but not necessarily all, equipment problems or failures should be transparent to Market Participants. This Section 7.7.14.1 addresses some situations when Market Participants could be affected, but it is impossible to identify and plan for every type of equipment problem or failure. Real-Time situations will be handled by the Real-Time CAISO dispatchers. The CAISO control room in Folsom is the Primary CAISO Control Center and the CAISO control room in Alhambra is the Backup CAISO Control Center.~~

~~7.7.14.2 CAISO's Secure Communication System Unavailable~~

~~7.7.14.2.1 Unavailable Critical Functions of CAISO's Secure Communication System~~

~~During a total disruption of the CAISO's secure communication system several critical functions of the CAISO will not be available including:~~

~~(a) the CAISO's scheduling infrastructure computer systems will not be able to communicate with Scheduling Coordinators to receive any type of updated Bid or Schedule information;~~

~~(b) the CAISO's scheduling infrastructure computer systems will not be able to communicate Congestion Management information and Schedule changes to the Scheduling Coordinators; and~~

~~(c) the CAISO will not be able to communicate general information, including emergency information, to any Market Participants.~~

~~7.7.14.2.2 Communications during Unavailability of CAISO's Secure Communication System~~

~~During any period of CAISO's secure communication system unavailability, the CAISO shall:~~

~~(a) make all reasonable efforts to keep Market Participants aware of current CAISO Controlled Grid status using voice communications;~~

~~(b) use the most recent set of Day-Ahead Schedules, RUC Schedules, AS Awards, FMM Schedules, and Dispatch Instructions for each Scheduling Coordinator for the current and all future Settlement Periods and/or Trading Days until the CAISO's secure communication system is restored; and~~

(c) attempt to take critical Bids, including ETC and TOR Self-Schedules changes, from Scheduling Coordinators via voice communications as time and personnel availability allows.

7.7.14.2.3 Primary CAISO Control Center – Loss of all Voice Communications

In the event of loss of all voice communication at the Primary CAISO Control Center, the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center of the loss of voice communications. The Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits. Once voice communications have been restored to the Primary CAISO Control Center, the CAISO will post this information on the CAISO's secure communication system.

7.7.14.2.4 Primary CAISO Control Center – Control Center Completely Unavailable

In the event that the Primary CAISO Control Center becomes completely unavailable, the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center that the Primary CAISO Control Center is unavailable. The Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits.

The Backup CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid. The Backup CAISO Control Center will notify the single point of contact at the transmission operations center of Pacific Gas and Electric Company by direct voice communication of the situation.

Once the Primary CAISO Control Center is again available, all functions will be transferred back, and the Primary CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

7.7.14.2.5 Primary CAISO Control Center - CAISO Energy Management System (EMS) Unavailable

Should an outage occur to the redundant EMS computer systems in the Primary CAISO Control Center, an auto transfer should occur to transfer EMS operation to the redundant EMS back-up computers at the Backup CAISO Control Center. Due to the severity of a total CAISO EMS computer outage, the Primary

~~CAISO Control Center will post information on the CAISO's secure communication system that the Primary CAISO Control Center EMS computer is unavailable and that EMS control has been transferred to the Backup CAISO Control Center.~~

~~When the Primary CAISO Control Center EMS computer is restored, the Backup CAISO Control Center will initiate a transfer back of the EMS system to the Primary CAISO Control Center. The Primary CAISO Control Center will post information on the restored EMS computer system status on the CAISO's secure communication system.~~

~~7.7.14.2.6 Backup CAISO Control Center – Loss of all Voice Communications~~

~~In the event of a loss of all voice communications at the Backup CAISO Control Center, the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center of the loss of voice communications. The Primary CAISO Control Center will post information on the situation via the CAISO's secure communication system. Additional voice notifications will be made as time permits. Once voice communications have been restored to the Backup CAISO Control Center, the Primary CAISO Control Center will post this information on the CAISO's secure communication system.~~

~~7.7.14.2.7 Backup CAISO Control Center – Control Center Completely Unavailable~~

~~In the event that the Backup CAISO Control Center becomes completely unavailable, the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center that the Backup CAISO Control Center is unavailable. The Primary CAISO Control Center will post information on the situation on the CAISO's secure communication system. Additional voice notifications will be made as time permits.~~

~~The Primary CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid. The Primary CAISO Control Center will notify the grid control center of Southern California Edison Company by direct voice communications of the situation.~~

~~Once the Backup CAISO Control Center is again available, all functions will be transferred back, and the Backup CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.~~

7.7.6~~15~~ **[This tariff section 7.7.6 revised to clarify and streamline language from current tariff section 7.7.15.1, to be consistent with the administrative pricing changes in revised tariff section 7.7.9, and to provide more logical locations for language from current tariff sections as discussed below]System Operations In The Event Of A Market Disruption**

~~**7.7.15.1**~~

(a) Actions in the Event of a Market Disruption, to Prevent a Market Disruption, or to ~~m~~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:

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

(2)~~(b)~~ remove Bids, including Self-Schedules, that have resulted in a Market Disruption previously, pursuant to Section 7.7.7;

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

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

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

(6)~~(f)~~ suspend the applicable CAISO Market and apply~~utilize~~ Administrative Prices established pursuant to Section 7.7.9~~to settle metered Supply and Demand~~;

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

(8)~~(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; or~~.~~

(9) postpone the publication of DAM market results.

(b) [Tariff language moved from current tariff section 7.7.15.3 to more logical location, this new tariff section 7.7.6(b)] Choices of Action to Prevent a Market Disruption, in

the Event of a Market Disruption, or to ~~m~~Minimize the Extent of a Market Disruption. The CAISO's choice of action in the event of a Market Disruption shall depend on the CAISO Market that is disrupted, the cause of the Market Disruption, the expected time to resolve the Market Disruption, and the status of submitted Bids and Self-Schedules at the time the Market Disruption occurs.

(c) [New tariff provision to implement administrative pricing change – see Pricing Enhancements Final Proposal at 12] Notification. In the event the CAISO may not publish DAM results, it will notify Market Participants as set forth in Section 7.7.9(b)(2).

(d) [Tariff language moved from current tariff section 7.7.15.4 to more logical location – this new tariff section 7.7.6(d) – and streamlined and clarified] Report~~ing~~s. ~~Requirements under Section 7.7.15~~ The CAISO shall include reports on actions taken pursuant to this Section 7.7.6~~15~~ in the Exceptional Dispatch report provided in Section 34.9.4 of the CAISO Tariff and shall include –~~. The report shall detail~~

(1) the frequency and types of actions taken by the CAISO pursuant to this Section 7.7.6;~~15, as well as~~

(2) the nature of the specific Market Disruptions that caused the CAISO to take action and the CAISO rationale for taking such actions, or the Market Disruption that was successfully prevented or minimized by the CAISO as a result of taking action pursuant to its authority under this Section 7.7.6~~15~~; and~~ This informational filing shall also contain~~

(3) general information on the Bids removed pursuant to Section 7.7.7~~15~~, which may include the megawatt quantity, point of interconnection, specification of the Day-Ahead versus Real-Time Bid, and Energy or Ancillary Services Bid, and the CAISO's rationale for removal; ~~provided, however,~~except that any Scheduling Coordinator-specific individual Bid information will be submitted on a confidential basis consistent with FERC's rules and regulations governing requests for confidential treatment of commercially sensitive information.

7.7.7~~15.2~~ [This tariff section 7.7.7 revised to clarify and streamline language from current tariff section 7.7.15.2] Removal of Bids~~,~~ in the Event of a Market Disruption, to Prevent a Market Disruption, or to ~~m~~Minimize the Extent of a Market Disruption

~~**7.7.15.2.1 Objective Measures**~~

(a) Types of Bids. ~~In the event of a Market Disruption, to prevent a Market Disruption, or to minimize the extent of a Market Disruption, as provided in Section 7.7.15.1 (b), the CAISO may remove Bids, which as defined include Self-Schedules, from the relevant CAISO Market.~~ The types of Bids that the CAISO may remove ~~include those that have previously caused a Market Disruption. These~~ are Bids that are not feasible based on the misalignment of resource-specific conditions and physical constraints represented in the Master File, current outage information, and the Bid itself. ~~For example, these include: (1) Bids that pass through the automated Bid validation rules but are invalid for other reasons not detectable by the automated Bid validation, including derates reflected in the CAISO's outage management system pursuant to Section 9; (2) Bids that are identified prior to the end of the CAISO Market run as causing a feasibility issue that prevents the CAISO Market run from clearing in the time allotted for the run, including Ramping rates in the CAISO's outage management system pursuant to Section 9 that result in infeasible generation Bids; and (3) multiple Bids that do not pose a problem for processing through the CAISO Market when considered individually, but may when submitted in combination with other Bids become infeasible and present an impediment to the successful completion of the CAISO Market.~~

~~**7.7.15.2.2 Consequences of Removal of a Bid**~~

(b) Removal of a Portion of a Bid. The CAISO may remove part of a Bid, but retain other parts of the Bid for the applicable CAISO Market run and interval for the same or a different product, and may retain parts of the Bid for subsequent CAISO Market runs or intervals.

(c) Removal of a Bid Pursuant to Section 7.7.6(a)(2). If a particular Energy or Ancillary Service Bid must be removed pursuant to Section 7.7.6(a)(2)~~15.2.1~~, the CAISO will remove the entire Bid for that particular service and market.

(d) Resubmittal of Bids. The Scheduling Coordinator may resubmit removed Bids in subsequent CAISO Markets, provided the Scheduling Coordinator complies with any operator instructions regarding the subject Bids.

(e) RUC Bids. In the event the CAISO removes a Bid ~~is removed~~ from an IFM run, the RUC Availability Bid associated with the removed IFM Bid may still be accepted for the corresponding RUC run, unless the CAISO determines that the RUC Availability Bid is ~~determined to be~~ the cause of the disruption. ~~A problematic Bid as described in Section 7.7.15.2.1 will typically be identified as infeasible prior to publication of the CAISO Market interval in which it is causing a problem, in which case to the extent practicable the CAISO may remove the Bid, execute the CAISO Market without the removed Bid, and publish a CAISO Market result for that interval. In some instances, a Bid may be able to clear through the IFM without causing an infeasibility issue, but then it may be necessary to remove the RUC Availability Bid associated with the IFM Bid for the corresponding RUC run due to infeasibility issues raised for the RUC run. In the Real-Time Market, for reasons discussed above, the CAISO may also be required to remove a Bid for a Non-Dynamic System Resource that normally would be accepted in the HASP, yet may be able to utilize and accept the Bid for the RTD and non-HASP RTUC runs of the Real-Time Market included within the same Scheduling Coordinator Bid submission.~~

(f) RTM Bids. If~~, for the reasons discussed above,~~ the CAISO ~~is required to~~ removes a Bid in the advisory RTUC or RTD runs ~~conducted for future intervals~~ during the Real-Time Market, the CAISO may still use the removed Bid ~~may still be used~~ in the binding runs of the Real-Time Market for the same interval if the problems previously experienced with the Bid do not arise.

(g) Energy Component of Ancillary Services Bids. ~~If an Ancillary Service Bid or Submission to Self-Provide Ancillary Services is removed from the IFM, the Scheduling Coordinator may resubmit these components in the RTM provided the issues identified in the IFM have been resolved and the Bid or submission is otherwise consistent with the Ancillary Service bidding rules in the CAISO Tariff.~~ If the CAISO ~~is required to~~ removes

an Ancillary Services Bid submitted to the Real-Time Market, the CAISO may retain the associated Energy Bid ~~submitted in association with the Ancillary Services Bid~~ for that CAISO Market run.

~~7.7.15.2.3~~

(h) Settlement Consequences of Removal of Bids

(1) Day-Ahead Market. In the event that a Bid is removed from the Day-Ahead Market, the Scheduling Coordinator whose Bid is removed will not be subject to Settlement for the Day-Ahead Market for the affected service. ~~The Scheduling Coordinator may then resubmit the Bid in the Real-Time Market for the same service and, to the extent the Bid is feasible and the issues identified have been resolved, it may be accepted in the Real-Time Market consistent with the CAISO Tariff requirements that apply to the Real-Time Market.~~

(2) Ancillary Services. In the case of Ancillary Services Bids, including Submissions to Self-Provide an Ancillary Service, that are removed from the Day-Ahead Market, the Scheduling Coordinator will not receive Settlement for the Ancillary Services in the Day-Ahead Market and will not receive an opportunity cost payment in the Day-Ahead Market for the offered service. ~~If the Bid is accepted in the Real-Time Market, the Scheduling Coordinator will be subject to Settlement based on the CAISO Market in which the Bid actually clears.~~

(3) Exceptional Dispatch. In the event that a Bid is removed from a CAISO Market run or interval, the CAISO may subsequently be required to issue an Exceptional Dispatch for the resource, in which case the Scheduling Coordinator will receive Exceptional Dispatch Settlement as provided in Section 11.5.6.

(4) Demand Bids. In the event that a Demand Bid is removed from the Day-Ahead Market, because no Demand Bids for load can be submitted in the Real-Time Market, Scheduling Coordinators for the load not cleared in the Day-Ahead

Market will be settled as Uninstructed Imbalance Energy as provided in Section 11.5.2.

~~7.7.15.2.4~~

(i) **Reporting to Affected Scheduling Coordinators.** To the extent practicable, the CAISO will contact a Scheduling Coordinator's representative before removing a Bid and advise the representative of the issues encountered with the Bid~~. In the event that a Bid is removed, the Scheduling Coordinator's Bid will not be cleared through the specific CAISO Market from which it was removed. The CAISO will notify the Scheduling Coordinator~~ as soon as practicable, but no later than three (3) Business Days, after the applicable Bid was removed and will provide information specifying when its Bid was removed and the nature of the disruption.

7.7.8 Under Frequency Load Shedding (UFLS).

~~7.7.8.1~~ Each UDC's UDCOA with the CAISO and each MSS Agreement through which the MSS Operator ~~undertakes to the CAISO to~~agrees to comply with the provisions of the CAISO Tariff shall describe the UFLS program for that UDC or for that MSS.

7.7.9 [This new tariff section 7.7.9 contains tariff provisions to implement administrative pricing changes – see Pricing Enhancements Final Proposal at 11-20, 23]

Application of Administrative Prices and Use of Prior Market Results

(a) In General. To manage an imminent or actual System Emergency or to prevent, manage, or minimize the extent of a Market Disruption, the CAISO will apply prior market results in accordance with this Section 7.7.9.

(b) Day-Ahead Market.

(1) Market Results. In the case of a suspension of the Day-Ahead Market –

(A) the CAISO shall use the Day-Ahead Market market results (except for Virtual Awards), as applicable, from the previous day for the Day-Ahead Market if the CAISO determines, based on expected system conditions, that using such market results will provide a reasonable profile of Schedules to meet the needs of the Real-Time;

(B) if the CAISO determines, based on expected system conditions, that using the Day-Ahead Market market results described in Section 7.7.9(b)(1)(A) will not reasonably meet the needs of the Real-Time, the CAISO may rely solely on the use of Exceptional Dispatch and other manual instructions and on the Real-Time Market market results, as applicable for pricing and Settlement purposes, except that notwithstanding Section 11.2.4, Congestion Revenue Rights will be settled using the hourly average of the 15-minute FMM prices for each hour of the Real-Time Market.

(2) Notification. In the event the CAISO has not published the Day-Ahead Market market results or determines it may suspend the Day-Ahead Market, it will notify Market Participants by 6:00 p.m., indicating whether the CAISO anticipates it will –

(i) publish the Day-Ahead Market market results, and if so, when;

(ii) use the previous day's Day-Ahead Market market results pursuant to Section 7.7.9(b)(1)(A); or

(iii) rely on the use of Exceptional Dispatch and other manual instructions and on the Real-Time Market market results pursuant to Section 7.7.9(b)(1)(B).

(c) Real-Time Market Not Suspended. In the case of a Market Disruption of the Real-Time Market when the Real-Time Market has not been suspended –

(1) if market results are unavailable for fewer than four (4) consecutive 15-minute FMM intervals, the CAISO shall use the FMM market results, as applicable, for the FMM interval immediately preceding the FMM interval(s) for which FMM market results are unavailable;

(2) if market results are unavailable for fewer than twelve (12) consecutive 5-minute Dispatch Intervals, the CAISO shall use the RTD market results, as applicable,

for the Dispatch Interval immediately preceding the Dispatch Interval(s) for which market results are unavailable;

(3) if market results are unavailable for at least four (4) consecutive 15-minute FMM intervals and market results are available for the RTD during those FMM intervals, the CAISO shall use the average of RTD market results, as applicable, during each such FMM interval and use the market results as applicable from the prior intervals for which market results are unavailable as needed;

(4) if market results are unavailable for at least twelve (12) consecutive 5-minute Dispatch Intervals and market results are available for the FMM during those Dispatch Intervals, the CAISO shall use the FMM market results, as applicable, from the applicable FMM during the Dispatch Intervals;

(5) if market results are unavailable for at least four (4) consecutive 15-minute FMM intervals and market results are unavailable for the RTD during those FMM intervals, the CAISO shall use the Day-Ahead Market market results, as applicable, for the corresponding Trading Hour for which market results are unavailable; and

(6) if market results are unavailable for at least twelve (12) consecutive 5-minute Dispatch Intervals and market results are unavailable for the FMM during those Dispatch Intervals, the CAISO shall use the previous day's Day-Ahead Market market results, as applicable, for the corresponding Trading Hour for which market results are unavailable.

(d) Real-Time Market Suspended. In circumstances where the Real-Time Market has been suspended, the CAISO shall use the previous day's Day-Ahead Market market results, as applicable, for the Trading Hour corresponding to the Trading Hour during which the Real-Time Market has been suspended.

(e) Default Provision. In circumstances that are not described in subsections (a) through (d) of this section or if the market results are for any reason unavailable, the CAISO shall

use market results, as applicable, from the most recent preceding applicable interval that produced acceptable market results.

~~7.7.15.3~~ ~~[Tariff language moved from this current tariff section 7.7.15.3 to more logical location, new tariff section 7.7.6(b)]~~ ~~Choices of Action to Prevent a Market Disruption, in the Event of a Market Disruption, or to minimize the Extent of a Market Disruption~~

~~The CAISO's choice of action in the event of a Market Disruption shall depend on the CAISO Market that is disrupted, the cause of the Market Disruption, the expected time to resolve the Market Disruption, and the status of submitted Bids and Self-Schedules at the time the Market Disruption occurs. Nothing in this Section 7.7.15 shall prevent the CAISO from taking any other action permitted under the CAISO Tariff.~~

~~7.7.15.4~~ ~~[Tariff language moved from this current tariff section 7.7.15.4 to more logical location – new tariff section 7.7.6(d) – and streamlined and clarified]~~~~Reporting Requirements under Section 7.7.15~~

~~The CAISO shall include reports on actions taken pursuant to Section 7.7.15 in the Exceptional Dispatch report provided in Section 34.9.4 of the CAISO Tariff. The report shall detail the frequency and types of actions taken by the CAISO pursuant to this Section 7.7.15, as well as the nature of the specific Market Disruptions that caused the CAISO to take action and the CAISO rationale for taking such actions, or the Market Disruption that was successfully prevented or minimized by the CAISO as a result of taking action pursuant to its authority under Section 7.7.15. This informational filing shall also contain general information on the Bids removed pursuant to Section 7.7.15, which may include the megawatt quantity, point of interconnection, specification of the Day-Ahead versus Real-Time Bid, and Energy or Ancillary Services Bid, and the CAISO's rationale for removal; provided, however, that any Scheduling Coordinator-specific individual Bid information will be submitted on a confidential basis consistent with FERC's rules and regulations governing requests for confidential treatment of commercially sensitive information.~~

7.7.10 ~~**[NOT USED]**~~ **CAISO Facility and Equipment Outages [Tariff language moved from current tariff section 7.7.14.2 to this revised tariff section 7.7.10 to reflect reorganization of tariff section 7.7, streamline, and clarify, and to eliminate references to locations of control centers]**

~~7.7.14.2~~ (a) **CAISO's Secure Communication System Unavailable**

(1) **Unavailable Critical Functions~~ of CAISO's Secure Communication System~~**

During a total disruption of the CAISO's secure communication system ~~–several critical functions of the CAISO will not be available including:~~

(A~~a~~) the CAISO's scheduling infrastructure computer systems will not be able to communicate with Scheduling Coordinators to receive any type of updated Bid or Schedule information;

(B~~b~~) the CAISO's scheduling infrastructure computer systems will not be able to communicate Congestion Management information and Schedule changes to the Scheduling Coordinators; and

(C~~c~~) the CAISO will not be able to communicate general information, including emergency information, to any Market Participants.

~~7.7.14.2.2~~ (2) **Communications~~ during Unavailability of CAISO's Secure Communication System~~** During any period that the~~of~~ CAISO's secure communication system is unavailable~~unavailability~~, the CAISO shall ~~–~~:

(A~~a~~) make all reasonable efforts to keep Market Participants aware of current CAISO Controlled Grid status using voice communications;

(B~~b~~) use the most recent set of Day-Ahead Schedules, RUC Schedules, AS Awards, FMM Schedules, and Dispatch Instructions for each Scheduling Coordinator for the current and all future Settlement Periods and/or Trading Days until the CAISO's secure communication system is restored; and

(C~~c~~) attempt to take critical Bids, including ETC and TOR Self-Schedules changes, from Scheduling Coordinators via voice communications as time and personnel availability allow~~s~~.

~~7.7.14.2.3~~

(b) **Primary CAISO Control Center Unavailability.**

(1) ~~–~~Loss of all Voice Communications. In the event of loss of all voice communication at the Primary CAISO Control Center –

(A) ~~,~~the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center of the loss of voice communications;~~.~~

(B) ~~T~~the Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system;~~.~~

(C) ~~A~~additional voice notifications will be made as time permits; and~~.~~

(D) ~~O~~once voice communications have been restored to the Primary CAISO Control Center, the CAISO will post this information on the CAISO's secure communication system.

~~7.7.14.2.4~~

(2) Complete Unavailability.~~Primary CAISO Control Center – Control Center Completely Unavailable~~ In the event that the Primary CAISO Control Center becomes completely unavailable –

(A) ~~,~~the Primary CAISO Control Center will use alternate communications to notify the Backup CAISO Control Center that the Primary CAISO Control Center is unavailable;~~.~~

(B) ~~T~~the Backup CAISO Control Center will post information on the situation on the CAISO's secure communication system;~~.~~

(C) ~~A~~additional voice notifications will be made as time permits;~~.~~

(D) ~~T~~the Backup CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid.

(E) **[Section updated to reflect that all PTOs will be notified]** ~~T~~the Backup CAISO Control Center will notify the Participating Transmission Owners ~~single point of contact at the transmission operations center of~~

~~Pacific Gas and Electric Company~~ by direct voice communication of the situation; and.

(F) ~~O~~once the Primary CAISO Control Center is again available, all functions will be transferred back, and the Primary CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

~~7.7.14.2.5 Primary CAISO Control Center -~~

(3) CAISO Energy Management System (EMS) Unavailable. Should an outage occur to the redundant EMS computer systems in the Primary CAISO Control Center –

(A) ~~, an auto transfer should occur to transfer~~ EMS operation will transfer to the redundant EMS back up computers at the Backup CAISO Control Center;

(B) ~~. Due to the severity of a total CAISO EMS computer outage,~~ the Primary CAISO Control Center will post information on the CAISO's secure communication system that the Primary CAISO Control Center EMS computer is unavailable and that EMS control has been transferred to the Backup CAISO Control Center; and~~.~~

(C) ~~W~~when the Primary CAISO Control Center EMS computer is restored, the Backup CAISO Control Center will initiate a transfer ~~back~~ of the EMS system back to the Primary CAISO Control Center~~.~~ – and ~~T~~the Primary CAISO Control Center will post information on the status of the restored EMS computer system ~~status~~ on the CAISO's secure communication system.

~~7.7.14.2.6~~

(c) Backup CAISO Control Center. ~~–~~

(1) Loss of all Voice Communications. In the event of a loss of all voice communications at the Backup CAISO Control Center –

(A) ~~,~~ the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center of the loss of voice communications;~~.~~

(B) Tthe Primary CAISO Control Center will post information on the situation via the CAISO's secure communication system;.

(C) Aadditional voice notifications will be made as time permits; and.

(D) Oonce voice communications have been restored to the Backup CAISO Control Center, the Primary CAISO Control Center will post this information on the CAISO's secure communication system.

~~7.7.14.2.7 Backup CAISO Control Center –~~

(2) Control Center Completely Unavailable. In the event that the Backup CAISO Control Center becomes completely unavailable –,

(A) the Backup CAISO Control Center will use alternate communications to notify the Primary CAISO Control Center that the Backup CAISO Control Center is unavailable;.

(B) Tthe Primary CAISO Control Center will post information on the situation on the CAISO's secure communication system;.

(C) Aadditional voice notifications will be made as time permits;.

(D) Tthe Primary CAISO Control Center will post confirmation on the CAISO's secure communication system that all computer systems are functioning normally (if such is the case) and take complete control of the CAISO Controlled Grid;.

(E) **[Updated to reflect that all PTOs will be notified]** Tthe Primary CAISO Control Center will notify the Participating Transmission Owners ~~grid control center of Southern California Edison Company~~ by direct voice communications of the situation; and.

(F) Oonce the Backup CAISO Control Center is again available, the Primary CAISO Control Center will transfer all functions ~~will be transferred~~ back to the Backup CAISO Control Center, and the Backup CAISO Control Center will notify all Market Participants via the CAISO's secure communication system.

* * * *

11.5.6.1 Settlement for FMM or RTD IIE from Exceptional Dispatches used for System Emergency Conditions, for a Market Disruption~~Interruption~~, to Mitigate Overgeneration Conditions or to Prevent or Relieve Imminent System Emergencies

[Tariff section updated to reflect revised definition of the term Market Disruption and deletion of the term Market Interruption]The Exceptional Dispatch Settlement price for incremental FMM or RTD IIE that is delivered as a result of an Exceptional Dispatch for System Emergency conditions, for a Market Disruption~~Interruption~~, to mitigate Overgeneration conditions, or to prevent or relieve an imminent System Emergency, including forced Start-Ups and Shut-Downs, is the higher of the (a) applicable FMM or RTD LMP, (b) the Energy Bid price, (c) the Default Energy Bid price if the resource has been mitigated through the MPM in the Real-Time Market and for the Energy that does not have an Energy Bid price, or (d) the negotiated price as applicable to System Resources. Costs for incremental Energy for this type of Exceptional Dispatch are settled in two payments: (1) incremental Energy is first settled at the applicable FMM or RTD LMP and included in the total IIE Settlement Amount described in Section 11.5.1.1; and (2) the incremental Energy Bid Cost in excess of the applicable FMM or RTD LMP at the relevant Location is settled pursuant to Section 11.5.6.1.1. The Exceptional Dispatch Settlement price for decremental IIE that is delivered as a result of an Exceptional Dispatch Instruction for a Market Disruption~~Interruption~~, or to prevent or relieve a System Emergency, is the minimum of (a) the FMM or RTD LMP, (b) the Energy Bid price subject to Section 39.6.1.4, (c) the Default Energy Bid price if the resource has been mitigated through the MPM in the Real-Time Market and for the Energy that does not have an Energy Bid price, or (d) the negotiated price as applicable to System Resources. All Energy costs for decremental IIE associated with this type of Exceptional Dispatch are included in the total IIE Settlement Amount described in Section 11.5.1.1.

11.5.6.1.1 Settlement of Excess Cost Payments for Exceptional Dispatches used for System Emergency Conditions, for a Market Disruption~~Interruption~~, and to Avoid an Imminent System Emergency

[Tariff section updated to reflect revised definition of the term Market Disruption and deletion of the term Market Interruption] The Excess Cost Payment for incremental Exceptional Dispatches used for emergency conditions, for a Market Disruption~~Interruption~~, or to avoid an imminent System Emergency

is calculated for each resource for each Settlement Interval as the cost difference between the Settlement amount calculated pursuant to Section 11.5.6.1 for the applicable Exceptional Dispatch at the FMM or RTD LMP and delivered Exceptional Dispatch quantity at one of the following three costs: (1) the resource's Energy Bid Cost, (2) the Default Energy Bid cost, or (3) the Energy cost at the negotiated price, as applicable for System Resources, for the relevant Exceptional Dispatch.

* * * *

11.5.6.2.5.2 Allocation of Exceptional Dispatch Costs to Scheduling Coordinators

[Tariff section updated to reflect revised definition of the term Market Disruption and deletion of the term Market Interruption] Excess Cost Payments for the Exceptional Dispatches used for emergency conditions and to avoid Market Disruption~~Interruption~~ and System Emergencies as determined pursuant to Section 11.5.6.1.1 shall be charged to Scheduling Coordinators as follows in a two-step process. First, each Scheduling Coordinator's charge shall be the lesser of:

(i) the pro rata share of total Excess Cost Payment based upon the ratio of each Scheduling Coordinator's Net Negative Uninstructed Deviations to the total system Net Negative Uninstructed Deviations; or

(ii) the amount obtained by multiplying the Scheduling Coordinator's Net Negative Uninstructed Deviation for each Settlement Interval and a weighted average price. The weighted average price is equal to the total Excess Cost Payments to be allocated divided by the MWh of Exceptional Dispatch Energy associated with the Excess Cost Payment.

Second, any remaining unallocated costs shall be allocated to all Scheduling Coordinators pro-rata based on their Measured Demand. For a Scheduling Coordinator of an MSS Operator that has elected to follow Load, allocation of this second category of Excess Cost Payments will be based on net metered MSS Demand. In addition, to the extent the Exceptional Dispatches are made to resolve congestion internal to the MSS, the Scheduling Coordinator for such an MSS will also be subject to these two categories of Excess Cost Payments.

A Scheduling Coordinator shall be exempt from the first category of the Excess Cost Payment allocation for a Settlement Interval if the Scheduling Coordinator has sufficient incremental Energy Bids from

physically available resources in the Real-Time Market for Energy to cover its Net Negative Uninstructed Deviation in the given Settlement Interval and the prices of such Energy Bids do not exceed the applicable maximum Bid level as set forth in Section 39.

* * * *

11.5.8.1 Settlement for Energy Purchased by the CAISO for System Emergency Conditions, to Avoid Market Disruption~~Interruption~~, or to Prevent or Relieve Imminent System Emergencies, Other than Exceptional Dispatch Energy

[Tariff section updated to reflect revised definition of the term Market Disruption and deletion of the term Market Interruption] The Settlement price for Energy that is delivered to the CAISO from a utility in another Balancing Authority Area as a result of a CAISO request pursuant to Section 42.1.5 or any other provision for assistance in System Emergency conditions, to avoid a Market Disruption~~Interruption~~, or to prevent or relieve an imminent System Emergency, other than Energy from an Exceptional Dispatch, shall be either (i) a negotiated price agreed upon by the CAISO and the seller or (ii) a price established by the seller for such emergency assistance in advance, as may be applicable. In the event no Settlement price is established prior to the delivery of the emergency Energy, the default Settlement price shall be the simple average of the relevant FMM and RTD LMPs at the applicable Scheduling Point, plus all other charges applicable to imports to the CAISO Balancing Authority Area, as specified in the CAISO Tariff. If the default Settlement price is determined by the seller not to compensate the seller for the value of the emergency Energy delivered to the CAISO, then the seller shall have the opportunity to provide the CAISO with cost support information demonstrating that a higher price is justified. The cost support information must be provided in writing to the CAISO within thirty (30) days following the date of the provision of emergency assistance. The CAISO shall have the discretion to pay that higher price based on the seller's justification of this higher price. The CAISO will provide notice of its determination whether to pay such a higher price within thirty (30) days after receipt of the cost support information. Any dispute regarding the CAISO's determination whether to pay a higher price for emergency assistance based on cost support information shall be subject to the CAISO ADR Procedures. Payment by the CAISO for such emergency assistance will be made in accordance with the Settlement process, billing cycle, and payment timeline set forth in the CAISO Tariff. The costs for such emergency assistance, including the payment of a price based on cost support information, will be settled in two

payments: (1) the costs will first be settled at the simple average of the relevant Dispatch Interval LMPs and included in the total IIE Settlement Amount as described in Section 11.5.2.1; and (2) costs in excess of the simple average of the relevant Dispatch Interval LMPs plus other applicable charges will be settled in accordance with Section 11.5.8.1.1. The allocation of the amounts settled in accordance with Section 11.5.1.1 will be settled according to Section 11.5.4.2.

* * * *

14. Uncontrollable Force ~~Majeure~~, Indemnity, Liabilities, and Penalties

14.1 Uncontrollable Forces

Neither the CAISO nor a Market Participant will be considered in default of any obligation under this CAISO Tariff if prevented from fulfilling that obligation due to the occurrence of an Uncontrollable Force. **[Tariff revisions to implement administrative pricing changes – see Pricing Enhancements Final Proposal at 21-22]** The physical inability of a Market Participant to perform in accordance with a Day-Ahead Schedule or Ancillary Service Award for any reason shall not relieve the Market Participant from its financial obligations under Section 11 that result from the failure to perform.

* * * *

16.3 ~~[NOT USED]~~[Tariff language moved from current tariff section 7.7.12 to more logical location – this tariff section 16.3 – and clarified] Curtailment Under Emergency And Non-Emergency Conditions

16.3.1~~7.7.12.1~~ Emergency Conditions

To the extent practicable, the CAISO shall allocate necessary curtailments of Existing Rights or non-Converted Rights under emergency conditions in accordance with the TRTC ~~i~~Instructions submitted by the Responsible PTO pursuant to Section 16.4. If circumstances prevent the CAISO's compliance with such TRTC ~~i~~Instructions, the CAISO shall allocate such curtailments in a non-discriminatory manner consistent with Good Utility Practice and Applicable Reliability Criteria.

16.3.2~~7.7.12.2~~ Non-Emergency Conditions

Unless otherwise specified by the Responsible PTO in the TRTC ~~i~~Instructions that it submits to the CAISO pursuant to~~under~~ Section 16.4, the CAISO will allocate any necessary curtailments under non-emergency conditions, pro rata, among holders of Existing Rights, at particular Scheduling Points and/or

on particular contract paths, in the order of: (1) non-firm, (2) each priority of conditional firm, and (3) each priority of firm rights. Priorities for firm and conditional firm transmission service are indicated using the TRTC Instructions as described in Section 16.4.

* * * *

29.7 [Revised to reflect impact of administrative pricing changes on EIM operations] EIM Operations Under Normal And Emergency Conditions.

* * * *

(j) **EIM Disruption.**

(1) **Declaration.** The CAISO may declare an interruption of EIM Entity participation in the Real-Time Market when in its judgment—

(A) operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO Market Disruption) in the EIM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria; or

(B) communications between the CAISO and EIM Market Participants are disrupted and prevent an EIM Entity, EIM Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information.

(2) **CAISO Response to EIM Disruption.** If the CAISO declares an interruption of EIM Entity participation in the Real-Time Market, the CAISO may in its judgment, among other things—

(A) separate the affected EIM Entity Balancing Authority Area from the EIM Area and maintain the Real-Time Market for other Balancing Authority Areas in the EIM Area by enforcing a net transfer constraint for the affected Balancing Authority Area to separate it from the remainder of the

EIM Area;

(B) reduce or suspend EIM Transfers between one or more Balancing Authority Areas in the EIM Area;

(C) instruct one or more EIM Entities to maintain system balance within their Balancing Authority Area without RTM Dispatch; or

(D) in addition or as an alternative, use market results ~~establish an Administrative Price~~ in the Real-Time Market in accordance with Section 7.7.~~4~~9 or take any of the actions specified in Section 7.7.~~15~~6 with respect to the Real-Time Market~~.~~, except that if Section 7.7.9 calls for the use of Day-Ahead Market results, the CAISO will use –

(i) the price specified in the EIM Entity's open access transmission tariff as the LMP;

(ii) the EIM Entity's EIM Base Schedule as the schedule;

(iii) the EIM Bid Adder from the most recent corresponding interval that is available as the EIM Bid Adder; and

(iv) the emissions rate set by the California Air Resources Board for an unspecified source multiplied by the daily Greenhouse Gas Allowance Price.

(3) **EIM Entity Responsibility.** In response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO, all EIM Entities shall follow NERC Reliability Standards applicable to their roles as Balancing Authorities in an effort to alleviate operational and system conditions and restore routine operations.

(4) **EIM Entity Scheduling Coordinator Responsibility.** All EIM Entity Scheduling Coordinators shall promptly inform the CAISO of actions taken by the EIM Entities they represent in response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO through updates to their EIM Base Schedules, Interchange E-Tags, transmission limit adjustments, or Outage and

derate information, as applicable.

(5) **System Restoration.** The CAISO shall reinstate normal operation of the Real-Time Market in the EIM Area at such time as it determines that the conditions that caused the interruption of EIM Entity participation in the Real-Time Market have been resolved.

* * * *

- Administrative Price

[Revised to reference the methodology for determining market results set forth in new tariff section 7.7.9] The market results determined according to Section 7.7.9.~~The price set by the CAISO in place of a Locational Marginal Price when, by reason of a System Emergency, the CAISO determines that it no longer has the ability to maintain reliable operation of the CAISO Controlled Grid relying solely on the economic Dispatch of Generation. This price will remain in effect until the CAISO considers that the System Emergency has been contained and corrected.~~

* * * *

- ~~Alert, Warning Or~~ Emergency ~~(AWE)~~ Notice

[Definition streamlined and revised to reference business practice manual consistent with deletion of current tariff section 7.7.3 discussed above] An electronic notice issued by the CAISO regarding a System Emergency as set forth in the Business Practice Manual.~~A CAISO operations communication issued to Market Participants and the public, under circumstances and in a form specified in CAISO Operating Procedures, when the operating requirements of the CAISO Controlled Grid are marginal because of Demand exceeding forecast, loss of major Generation sources, or loss of transmission capacity that has curtailed imports into the CAISO Balancing Authority Area, or if insufficient Bids for the Supply of Energy and Ancillary Services have been submitted in the RTM for the CAISO Balancing Authority Area.~~

* * * *

- Backup CAISO Control Center

[Clarification to reflect the fact that CAISO control center will no longer be in Alhambra and that location need not be identified in the tariff] The alternate CAISO Control Center. ~~located in Alhambra, California.~~

* * * *

- Excess Cost Payments

[Definition updated to reflect revised definition of the term Market Disruption and deletion of the term Market Interruption] The payments made by the CAISO for costs associated with Exceptional Dispatches for 1) emergency conditions, to avoid Market Disruption~~Interruption~~ and avoid an imminent System Emergency as provided in Section 11.5.6.1.1; 2) transmission-related modeling limitations as provided in Section 11.5.6.2.3; 3) Condition 2 RMR Units as provided in Section 11.5.6.3.2; and 4) emergency Energy as provided in Section 11.5.8.1.1.

* * * *

~~**- Force Majeure**~~

[Definition deleted because it will no be longer used in the tariff pursuant to other tariff revisions proposed herein]~~Force Majeure" shall mean any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's control. A Force Majeure event does not include acts of negligence or intentional wrongdoing by the Party claiming Force Majeure.~~

* * * *

- Market Disruption

[Definition revised to combine the term Market Disruption with the deleted term Market Interruption] An action or event that causes a failure of a CAISO Market, related to system operation issues or System Emergencies referred to in Sections 7.6, ~~and~~ 7.7, and 34.10, including actions taken by the CAISO to prevent, manage, or minimize the extent of a Market Disruption.~~respectively.~~

* * * *

~~**- Market Interruption**~~

[Definition deleted due to combination with the revised definition of the term Market Disruption]

~~Actions taken by the CAISO outside of the normal market operation of any of the CAISO Markets in the event of a Market Disruption, to prevent a Market Disruption, or minimize the extent of a Market Disruption as provided in Sections 7.7.15 and 34.9.~~

* * * *

- Primary CAISO Control Center

[Clarification to reflect the fact that the location of the primary CAISO control center need not be identified in the tariff] The CAISO Control Center ~~located in Folsom, California~~.

Attachment D – Final Proposal

Tariff Amendment to Implement Administrative Pricing Policy and Tariff Clarifications
California Independent System Operator Corporation

November 23, 2016

Pricing Enhancements

Final Proposal

October 30, 2014

Table of Contents

1 Background and Scope

The ISO has resumed the initiative for Administrative Pricing rules and broadened its scope to include other pricing enhancements. Through its continued effort to improve the efficiency of its markets, the ISO has identified three items related to pricing in the ISO markets. These three items, together with the scope of the initial administrative pricing initiative compose this stakeholder initiative identified as *Pricing Enhancements,* which was launched in August 2012. Specifically, the items considered in this initiative are:

1. Scope set forth in initial administrative pricing initiative
    a. Administrative pricing rules,
    b. Emergency tariff authority, and
    c. Force Majeure.

2. Scheduling priority for existing transmission rights schedules.

This issue concerns the bidding rules for existing transmission rights and transmission ownership rights (ETC/TOR). The ISO is proposing an enhancement to avoid instances where market participants may be exposed to congestion costs created by a bid error.

3. Compounding pricing methodology in the event of multiple contingencies.

This item concerns the compounding effect on pricing for a constraint concurrently binding for multiple contingencies when the constraint needs to be relaxed. Currently, when such cases arise, locational marginal prices reflect a compounded congestion cost component that is proportional to the number of contingencies the constraint is binding for.

4. Multiplicity of prices under “degenerate” conditions.

This enhancement will address the multiplicity of prices that may arise in the ISO markets under certain scenarios. Historical cases of multiplicity of prices have been observed on intertie constraints. The ISO is proposing an enhancement that can lead to a unique pricing outcome.

In this final proposal, the ISO has further elaborated on the administrative pricing rules along the comments provided in the previous round, including some numerical examples. It has also clarified the description of the use of a weight associated with the new slack variable used in the reformulation of the problem to deal with multiplicity of prices.

2 Plan for Stakeholder Engagement and Scope

The proposed schedule for stakeholder engagement is listed below. ISO management expects to present any proposed changes and policy recommendations to the CAISO Board of Governors in December 2014.

Date	Event
Tue 7/01/14	Issue Paper and Straw Proposal Posted
Thu 07/10/14	Stakeholder Call
Tue 7/22/14	Stakeholder Comments Due
Wed 9/26/14	Revised Straw Proposal Posted
Wed 10/03/14	Stakeholder Call
Wed 10/10/14	Stakeholder Comments Due on Straw Proposal
Tue 10/230/14	Draft Final Proposal Posted
Tue 11/06/14	Stakeholder Call
Tue 11/13/14	Stakeholder Comments Due on Draft Final Proposal
December 2014	BOG

The following sections introduce each of the four items of this expanded stakeholder initiative.

3 Administrative pricing rules

3.1 Issue

Administrative Pricing

On June 13, 2012, FERC granted the ISO's petition to waive tariff provisions related to setting administrative prices and settling real-time market transactions in response to the September 8-9, 2011 southwest power outage.[1] FERC found that the administrative prices established by the ISO to set price signals in order to manage the emergency (initially $250, which was later reduced to $100 per MWh) were not authorized by the tariff, but granted the ISO's waiver request. Section 7.7.4(3) explicitly sets the administrative price at the level of the applicable price for the last valid settlement period which, in the SDG&E area, for example, would have been $54 per MWh. FERC disagreed with the ISO that the discretion provided in section 7.7.2 to take any action it "considers necessary" relieves the ISO of its requirement to comply with section 7.7.4(3) when setting the administrative price. FERC concluded that section 7.7.4(3) should be read in conjunction with section 7.1.3(h) that confers upon the ISO general authority to operate resources in a system emergency and that, if section 7.7.2 could be read as expansively as the ISO argued, then the ISO would have virtually unfettered discretion to justify any action or behavior in an emergency situation.

FERC also granted a tariff waiver to permit the ISO to hold tripped load and resources harmless;[2] however, FERC declined to decide whether the September 8 southwest power outage constituted a force majeure event or whether ISO had tariff authority to hold resources harmless in the event of a force majeure event. FERC acknowledged the ISO's commitment to consider tariff changes to avoid confusion in the event of a similar emergency or market disruption in the future through an upcoming stakeholder process, will address this issue going forward. The proposed scope of the initiative for administrative pricing includes:

1. What conditions justify market suspension?
2. Should the ISO have the ability to split the market into regions so that the entire market does not need to be suspended during a regional event?
3. Should the ISO have the authority to establish an administrative price that is different from the current default value which is the last valid price in the market prior to intervention or suspension?
4. If so, how should the ISO determine the appropriate administrative price?

[1] The FERC order is available at http://www.ferc.gov/EventCalendar/Files/20120613122539-ER12-205-000.pdf

[2] The "hold harmless" remedies reversing out the day-ahead schedules and awards for loads and resources.

5. What considerations warrant adjustments to the administrative price rather than returning to the default administrative price?
6. What hold harmless provisions should be established for tripped load, physical resources and convergence bidders during market suspension or force majeure events?
7. Is there a need to provide more clarity concerning the definition of a force majeure event and any actions the market participant or ISO must take and the settlement consequences?
8. Does the ISO need to improve its communication protocols to scheduling coordinators and resource owners and operators?
9. Should the ISO impose penalties on owners, operators and/or scheduling coordinators for failing to respond in a timely manner to exceptional dispatches or operating orders in emergency conditions?
10. Should convergence bidding be suspended until some period of time after system restoration?
11. What other changes to the ISO's emergency tariff provisions should be considered?
12. Other clarifications based on stakeholder comments to issue item.

Table 1 shows a summary of the administrative pricing rules among other ISOs.

Table 1: Summary of Administrative Pricing at Other ISOs

ISO/RTO	Administrative Pricing Protocols
PJM	Manual 11, Section 2.10 PJM Real-time Locational Marginal Price Verification Procedure In the event of a data input or program failure, LMP replacements will be performed as outlined below: 1. If the stale data or program failure exists for less than 6 intervals within the same hour then the affected intervals will be replaced with data from the last successful interval. 2. If the stale data or program failure exists for more than six intervals within the same hour then: If the hour is unconstrained, the hourly LMP will be replaced with the hourly integrated dispatch rate, or if the system is constrained, the LMP values will be recalculated using data from the best available sources. If the stale data or program failure exists for less than 6 intervals within the same hour but the previous hour had 12 failures then: If the hour is unconstrained, the hourly LMP will be replaced with the

ISO/RTO	Administrative Pricing Protocols
	hourly integrated dispatch rate, or If the system is constrained, the LMP values will be recalculated using data from the best available sources.
New England ISO	Manual 11, 2.5.10 ISO Real-Time Price Verification Procedure In the event of a data input or program failure and LMPs, RCPs or Real-Time Reserve Clearing Prices cannot be recalculated as described above, replacements will be performed as outlined below: (a) If the stale data or program failure exists for 11 intervals or less within the same hour then the affected intervals will be replaced with data from the last successful interval or the next successful interval, as appropriate. (b) If the stale data or program failure exists for all intervals within the same hour then the replacement values will be recalculated using data from the best available sources.
New York ISO	OATT Attachment Q Procedures for Reserving and Correcting Erroneous Energy and Ancillary Services Prices 23.2 Methodology for Correcting Prices In the event of a catastrophic failure of the ISO's price calculation software, the ISO shall provide notice of the problem to the Commission and Transmission Customers as soon as possible, but in no event later than the next business day. Following consultation with Transmission Customers regarding the procedures to be used, the ISO shall construct prices as close as possible to the prices that should have resulted from the application of the market rules established in the tariffs to prevailing system conditions.
Midwest ISO	Energy and Operating Reserve Markets Business Practices Manual 9.1.4 LMP/MCP Replacements In the event of a data input failure or program failure that make Ex-Post LMPs and MCPs unavailable, 'replacement' values are calculated in the following way:

ISO/RTO	Administrative Pricing Protocols
	- Where the stale data or program failure exists for eleven or fewer intervals within the same Hour, the affected intervals are replaced with data from the last successful interval or the next successful interval, as appropriate, as described in Section 9.1.5.1. - Where the stale data or program failure exists for all intervals within the same Hour, the following occurs: 1. Where the Hour is unconstrained and Scarcity Prices have not been applied, the Ex-Post LMP is replaced with the Ex-Ante LMP and the Ex-Post MCP is replaced with the Ex-Ante MCP; 2. Where the system is constrained, the Ex-Post LMP values and Ex-Post MCP values are recalculated using data from the best available sources. The Ex-Post LMP and MCP values are recalculated for each five-minute Dispatch Interval and then integrated and weighted in accordance with the calculations under Sections 9.1.5 and 9.1.6 of this BPM.
ERCOT	Protocol Section 6.5.9.2 Failure of the SCED Process (1) When the SCED process is not able to reach a solution, ERCOT shall declare an Emergency Condition. (2) For the intervals in which no solution was reached due to an SCED process failure are equal to the LMPs in the most recently solved interval. For Settlement Intervals that the Real-Time Settlement Point Prices are identified as erroneous and ERCOT sets the SCED intervals as failed in accordance with paragraph (3)(b) of Section 6.3, Adjustment Period and Real-Time Operations Timeline, then the LMPs for the failed SCED intervals are equal to the LMPs in the most recently solved SCED interval that is not set as failed. ERCOT shall notify the market of the failure by posting on the MIS Public Area

Market Suspension during System Emergency

Tariff section 7.7 outlines the management of system emergencies. The ISO proposes to amend this tariff section and other sections, if necessary, to clarify and supplement the ISO's authority during significant system emergencies that require the ISO to suspend the market to take the actions it took on September 8-9 and to clarify authority or to take such additional actions, including the assessment of penalties, as may be necessary to manage the grid to maintain reliable operations during increasingly worsening conditions. The ISO will consider stakeholder comments submitted to FERC in response to the ISO's waiver petition[3] as well as stakeholder comments submitted in the administrative pricing and pricing enhancement stakeholder processes.

Among the items to be explored are the following:

- Are additional criteria needed, beyond those already included in section 7.7.1, to determine when the market can be suspended? Should the ISO clarify section 7.7.2 regarding both the ISO and market participant responsibilities during market suspensions?
- What changes are necessary to section 7.7.4, regarding administrative prices, in order to allow the ISO to set the administrative price different from the last valid interval market price?
- When and what criteria should be used to set the administrative price when the market is not producing prices or when the prices produced are not consistent with actual market and grid conditions?
- Should administrative prices be set regionally and/or should ISO apply administrative prices in regions where a market result is infeasible?

Settlement during Market Suspension or Force Majeure Events

There are several embedded issues that need to be considered in reaching a proposal:

1) What is a force majeure event under the CAISO tariff?

2) Since the ISO tariff provides for no settlement relief from paying for real-time uninstructed deviations in the event of a force majeure event, should the ISO amend the tariff to afford relief in the event of force majeure and, if so, what should those rules be—a settlement rule that excuses financial responsibility for uninstructed deviations or would excuse any additional penalty for uninstructed deviations.

[3] Substantive comments were filed in Docket ER12-205-00 by Powerex Corp., NRG Companies, Morgan Stanley Capital Group Inc., Financial Marketers, Western Power Trading Forum, California Department of Water Resources State Water Project, and Macquarie Energy LLC. The comments are available at http://www.ferc.gov/docs-filing/elibrary.asp.

3) Should the ISO tariff be clarified to specify the conditions that justify the ISO suspending the market?

4) What additional administrative pricing authority should the ISO have when the market is suspended?

5) Should the market be settled differently when the market is suspended and administrative pricing is in place?

6) The factual circumstance that existed on September 8, 2011 and which caused the ISO to hold both physical loads and resources harmless was because both loads and resources tripped; should the hold harmless rule always apply when load and resources trip and only apply when load and resources trip?

7) Are there any other circumstances when day-ahead transactions should be liquidated at the day-ahead price, *i.e.*, the hold harmless settlement?

8) If hold harmless settlement is not appropriate, should additional costs be eligible for recovery through the ISO's bid cost recovery mechanism?

This stakeholder process will also consider new provisions for the settlement of load, physical supply, interties, and virtual bids when the market is suspended during system emergencies. Should market rules remedy inconsistencies between the administrative price and market participants' bid prices? If a remedy is required, should the remedy be implemented through the bid cost recover mechanism or some other mechanism? Should bid cost recovery rules change during market suspension such that both imports and exports are eligible for bid cost recovery?

In reviewing other ISOS in the United States, none of the other five ISOs appear to have any additional documentation other than their respective Tariff languages regarding force majeure. With the similarity of all of the Tariff sections, none appear to offer relief from imbalance energy charges that result from a force majeure event. The Midwest ISO seems to have some provisions for exemptions of energy settlements during events or conditions beyond the control of the market participant.

Communication Improvements

Stakeholders stated that CAISO needs clearer communication channels or standing default tariff provisions so that market participants know whether the information the ISO releases during a similar system emergency is valid. For example, are verbal dispatch instructions mandatory or voluntary during market suspension when the instruction may be inconsistent with the entities' bids? Assuming the market rules are sufficiently explicit should penalties be considered for not following instructions during a market suspension? The communication improvements should result in additional tariff provision as well as improvement to BPM documentation.

3.2 Straw Proposal

3.2.1 Administrative Pricing

The current administrative pricing implementation in real-time markets uses the price from the interval immediately preceding the interval in which the market disruption occurred or the ISO has effectuated a market suspension. The ISO experiences minor market disruptions in the real-time market due to software maintenance (such as database updates and software releases) or unexpected software issues, these occur under normal and non-emergency situations. The ISO can also intervene in the ISO markets during system emergencies or to prevent system emergencies and suspend or disrupt the market and operate the system manually, in which case the Administrative price will also apply for purposes of settling imbalance energy. The administrative pricing can apply to any market or product, including the day-ahead market, fifteen- and five-minute markets.

3.2.1.1 Day-Ahead Markets

PJM has recently taken the additional step to define what pricing and scheduling would be used for their day-ahead market, in case they cannot publish results by 23:59 on the day prior to the trade date.[4] If the day-ahead run cannot be produced and published then all day-ahead schedules and prices will be set to zero.[5] PJM's proposal and filing were the result of a business continuity exercise which identified that if there were, for example, an extraordinary internet-related outage, its ability to produce and publish day-ahead results could be impacted. The CAISO has five years of experience with the nodal market and has not failed to publish day-ahead market results, but is not immune to extraordinary technical

[4] FERC Docket No. ER13-2285-000
[5] PJM Open Access Tariff Section 1.10.8 (d)

issues, and administrative pricing for the day-ahead market should be considered in this initiative as well.

Section 31.6 provides the ISO with sufficient authority to delay the publication of the day-ahead market results to preserve system reliability or prevent a system emergency, to deal with errors or delays that require additional time to run the market, data problems etc. Delayed postings do not constitute a complete failure of the market. Only in more extreme circumstances would the ISO completely abort the day-ahead market (see Section 31.6.3). Although the day-ahead market results only matter for the effective trade date, the latest the ISO needs to produce day-ahead market results is by 20:00 hrs due to real time processes. However, there is a more stringent timeframe imposed by the fact of letting participants know of their schedules and have enough leading time to be able to meet commitment instructions. For this reason, the ISO is proposing that if by 18:00hrs the day-ahead solution is not available, the ISO will need to trigger its provision proposed below.

For the day-ahead market, the ISO is proposing that in the case of a market disruption or market suspension, such as a software issue that results in a complete failure to clear the market and post results for that day, to use either of two approaches:

i) Use the day-ahead results -both awards and prices- from the previous day Taking this option will depend on the evaluation of expected system conditions and the schedules from previous day ahead to determine that the previous day dispatches are within a reasonable scope to be used for the missing day; the health of the real-time market will also need to be considered to make this determination. For the works case, this approach needs to work also for conditions where there is no real-time market functioning.

ii) Based on expected system conditions it is found that using the previous day will not provide a reasonable profile of schedules to meet the needs of the real time (such the missing day is a Monday and previous day, Sunday, is too different in load profile or transmission conditions) and the real time market is operating well then leave the entire market up to the real-time market, with the need to manually dispatch long start unit, and other units as needed, adjust conditions based on manual instructions.

This approach of either-or will provide with the flexibility required to make a determination based on actual factors impacting the trading date. This either-or proposal is aiming on leveraging on using a day ahead solution; there are several factors to consider for this. If such an event is also impacting the real-time market, the real time market also defaults to use the day-ahead results. If the day-ahead results are simply set to zero and the real time market is running, everything would be left up to the real time market, and one of the complications is that the real time market could not project beyond 4.5 hours of the day and for instance long-start

resources could not be committed through the real-time market. Second, there are some data inputs coming into the real-time market from the day-ahead market and under ideal conditions, the real-time market will need to rely on some form of day-head information. Third, using the day-ahead market solution will also provide clarity and certainty to resources. If some resources need to align and get fuel prior to the trading date, it is better for resources to in advance of the day the expected generation requirements for the entire day, instead of relying hour by hour of the real time market.

There was a concern that using the previous day solution for the missed day-ahead could result in unreasonable settlements obligations to resources that could not deliver, specifically for cases of resources on outages. This proposal recognizes that the option of using previous day needs to reconcile for this outliers instances. For resources on outage, there is an expectation that such outages will be already logged in the ISO systems by the time the decision is made to use previous day (otherwise, even a normal run of the day-ahead market would potentially still commit resources) and during the evaluation of conditions for the next day the ISO will identify such resources on outages and they will not be subject to the schedules from previous days. If a resource happens to have an outage in the real-time, this would not be different to the normal operation and process of any normal day. For both physical and intertie resources and if the real time market is functioning, they still have the opportunity to bid in the real time.

3.2.1.2 Real-Time markets

The current requirement of using last valid price for a limited number of missing FMM or RTD intervals may be the most reasonable pricing to use given a minor market disruptions. The ISO needs to consider market disruptions of longer duration in the real-time market where the last available price may not provide the right price signal when system conditions change from hour to hour. Through this stakeholder process, the ISO is proposing to apply administrative pricing based on the nature of events as well as relying on the number of intervals impacted. This tiered approach aligns with practices in other ISOs. The generic option of setting the price using the best data available, which is included in several ISO/RTO tariffs is not under consideration as it does not provide sufficient details of steps and considerations used. When the ISO reaches the point of having a market disruption or suspension, there is a high likelihood that the ISO may not be able to rerun the markets in a manner that would reflect a realistic solution; under such conditions, a rerun of the market will usually not be possible or would require the ISO making assumptions and approximations which will potentially lead to have the results of the market reruns being challenged after the fact. This would actually be detrimental to the market certainty required under these

conditions. Notice that the ISO pricing is an *ex post* mechanism, unlike other ISOs that rely on ex ante pricing, for which there may be an option of adhering to use the best available data.

As described in section 7.7.15.1 of the ISO tariff, administrative pricing applies to market disruptions, including software failures that results in no market outcomes and blocked intervals. The market disruptions are properly classified and reported to the Commission on a monthly basis. A market suspension, however, may be triggered when the ISO invokes its authority of section 7.7.4. In both instances, under the current tariff, an administrative price is used. Currently, the administrative pricing is unique and relies on using the latest available price that was properly produced by the market software.

The proposal for an administrative price for the real time set forth in this initiative considers a three-tier approach; specifically,

i) if 15-minute market prices are missing for less than four consecutive intervals or if the 5-minute interval dispatch market prices are missing for less than 12 consecutive intervals, then the ISO will preserve the current administrative pricing of using the last best price for each market accordingly.
ii) If the 15-minute market prices are missing for more than three consecutive intervals or the 5-minute market prices are missing for more than 11 consecutive intervals under normal system conditions, then
    a) If the real-time interval (RTD) dispatches prices are not available but the 15-minute market prices are available, then missing RTD prices will be filled in with the 15-minute markets, regardless of how many intervals (for greater than 11 RTD or 3 FNM) are missing as long as the missing prices are related to a market disruption and the market is unable to produce prices. Conversely, if the 15-minute market prices are missing but the 5-minute market prices are available, the 5-minute market prices will be used to fill in the 15-minute prices by using the simple average of the three RTD prices. This approach is proposed based on the fact that if one real-time market is missing but the other one is available, the market being available will reflect the closest conditions to the missing market prices and if this persist for a longer period of time using the prices available from the other real-time sub-market will still capture the nature of prices changing over time during the period of the event.

       This alternative has the benefit of allowing market participants to know just on time what price will be used as the administrative price. Additionally, defaulting to using prices from the other real-time market would minimize the participants' exposure to imbalance charges between the 15-minute market and the 5-minute market.
    b) There may be other conditions where both the 15-minute nor 5-minute market prices are not available and the replacement process described above cannot be

implemented. When both the 15- and 5-minute real-time prices are not available, one can use either a reference of either similar day(s) for real time or day-ahead prices for same period. Using an average price for the last few days of the real time may be a viable option; for instance, a logic could be built upon using the average of the last two similar days (weekdays or weekends) for the same time period; one caveat is that with the inherent dynamic and volatile nature of the real time, there might be conditions where the resulting prices could not be reflective of similar conditions; say, if the previous days had an event that resulted in persistent and extreme low or high prices, this price would heavily influence the administrative price for the subsequent day. The price would also be subject to calculation and subject to change from the price correction process because is calculated based on real-time prices from previous days which are subject to potential price corrections. For practical purposes, using the day-ahead price for the same trading date and hours would provide certainty of what prices are being used if administrative pricing is triggered, and will also minimize imbalances charges across markets when a real-time market disruption happens; this approach will still capture the time-based changing nature of the market prices in case a market disruption spans over multiple hours.

Tier I and tier II do not combine; it is always one or the other methodology.

Let's consider a few examples to illustrate this process. The following table illustrates two hours of the market with all prices available:

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50	50	50	51	51	51	40	40	40	45	45	45	39	39	39	53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65	62	60	59	59	55	35	36	38	39	44	43	43	48	50	55	57	59

Scenario 1: RTD prices are missing for five intervals, then use last available RTD price:

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50	50	50	51	51	51	40	40	40	45	45	45	39	39	39	53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65	62						36	38	39	44	43	43	48	50	55	57	59

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50	50	50	51	51	51	40	40	40	45	45	45	39	39	39	53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65	62	62	62	62	62	62	36	38	39	44	43	43	48	50	55	57	59

Scenario 2: Both FNM and RTD prices are missing, each one, for less than 12 and 4 intervals respectively. Then use last available price for each market:

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50	50	50				40	40	40	45	45	45	39	39	39	53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65							36	38	39	44	43	43	48	50	55	57	59

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50	50	50	50	50	50	40	40	40	45	45	45	39	39	39	53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65	65	65	65	65	65	65	36	38	39	44	43	43	48	50	55	57	59

Scenario 3: RTD prices are missing for more than 11 intervals and FNM prices are available, then use FNM prices for corresponding intervals:

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50	50	50	51	51	51	40	40	40	45	45	45	39	39	39	53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65	62															57	59

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50	50	50	51	51	51	40	40	40	45	45	45	39	39	39	53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65	62	51	40	40	40	45	45	45	39	39	39	53	53	53	60	57	59

Scenario 4: FNM prices are missing for more than 3 intervals, the use simple average of RTD prices for corresponding intervals:

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48																53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65	62	60	59	59	55	35	36	38	39	44	43	43	48	50	55	57	59

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	60.6	60.6	60.6	62.3	62.3	62.3	57.6	57.6	57.6	36.3	36.3	36.3	42	42	42	53	53	53	60	60	60
RTD Price	44	46	47	47	70	65	65	62	60	59	59	55	35	36	38	39	44	43	43	48	50	55	57	59

Scenario 5: Both FNM and RTD prices are missing for more than 3 and 11 intervals, accordingly, then use DAM prices

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50																			60	60
RTD Price	44	46	47	47																			57	59

Hour Ending	13												14											
FNM Interval	1	1	1	2	2	2	3	3	3	4	4	4	1	1	1	2	2	2	3	3	3	4	4	4
RTD Interval	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
DAM Price	40												50											
FNM Price	48	48	48	50	40	40	40	40	40	40	40	40	50	50	50	50	50	50	50	50	50	50	60	60
RTD Price	44	46	47	47	40	40	40	40	40	40	40	40	50	50	50	50	50	50	50	50	50	50	57	59

iii) The logic described in items *a* and *b* above will cover non-emergency instances of market disruptions where prices are missing and an administrative price is required. The third tier goes beyond these typical market events and touches the core of the discussion that took place with the ISO requesting a waiver for the September 8, 2011. This tier is designed to address instances where an administrative price is required to deal with atypical scenarios not covered in the previous two tiers described above. Consequently, it is expected that this tier is triggered in very few exceptional circumstances. First, this approach will be triggered only under the condition where the ISO has suspended the market. This could occur under two scenarios: (1) the market could fail as a result of catastrophic software failure; or (2) the market results are of such poor quality that system operations cannot rely on them for reliable operation of the grid. The September 8, 2011 event involve a large scale system emergency where generation and load tripped. Although the ISO's market software continued to function, the market results did not reflect the major system changes resulting in dispatches that were not reflective of actual conditions. Accordingly, the ISO suspended the market and set an administrative price to establish an appropriate market signal. In the absence of conditions justifying a market suspension, the administrative pricing described in the previous two sections would apply to any market disruptions that require administrative pricing.

During a market suspension, it is of paramount importance to have an administrative price that will suffice to provide a price signal and incentive for resources to help the ISO manage grid conditions reliably, such as having generation capacity to remain online to meet demand under prevailing conditions and to enable the restoration of the system in the case of outages. One of the options explored was to use the day-ahead prices times a premium factor. This factor could either be defined *a priori* and be applicable for any instances where a market suspension is triggered, or could be estimated by the ISO once there is an event requiring this administrative pricing. The complication turns out to be the basis to use any premium factors. Another complication envisioned by using a premium factor would be the settlements

complications. In some instances, a price different than the DAM price will result in imbalance charges to participants in the real time market. For this reason, the ISO's proposal for this third tier is to simply use the day-ahead prices. Since there will be no real-time market functioning, for purposes of any settlements the bid from the day-ahead market will be used as well.

Another concern raised about the market suspension of September 8, 2013 was the triggers and factors used to suspend the market; defining a threshold for when the market should be suspended would be a futile exercise with all the potential factors and interplays that may impact the system and market at any given time. Section 7 of the ISO tariff provides general guidelines of when to call upon for a system emergency and allows for the ISO to make the determination if a market suspension is required. Some participants commented in the direction of using a hard-defined threshold, like the system losing a percentage of load. A hard threshold or trigger fails to capture the inherent complexity of the system and the myriad of potential scenarios. For instance, if a threshold of 10% of tripped load were used, does that mean that a loss of load of 9% would not require a market suspension even when there are grounds indicating that the market is not producing an outcome in alignment with the system conditions? What if the load loss was 11 percent but the market is producing reasonable results and there is no need to suspend the market? For any practical purposes, what would the gain be of having such a threshold under these two scenarios? For this reason the ISO believes it is important to maintain the operational discretion to call a market suspension based on actual events and conditions. After the fact, the ISO commits to provide a description of the conditions led to the ISO to intervene or suspend the market. This, together with the certainty of the administrative price to be used and the settlements provisions defined through this stakeholder process will provide the required certainty and transparency of the ISO actions during a system emergency leading to a market suspension.

Some participants raised concerns of using price thresholds for deciding whether a market suspension is applicable or not. As elaborated in the material related to the September 8, 2011 event, the determination for the market suspension was not due to the prices exceeding certain levels; instead, it was because the actual system conditions were not reflected in the prices being generated by the market, which was using an inconsistent network topology information with respect to the load and generation being connected to the system. Thus, dispatches and prices aligning with the overall system conditions are the primary elements for the ISO to consider when calling upon for a market suspension.

Another element to consider in the discussion is whether the administrative price triggered by a market suspension needs to apply across the entire system or be confined to specific regions of the system. Ideally, if the condition exists in a region of the system, the administrative pricing would be required only for that specific region. The split of the system in regions to apply the administrative pricing poses some practical challenges. First, it would be difficult to define *a priori* what regions in the system should be applied to. If an emergency and market suspension occur, the likelihood of having the issue confined to a pre-defined and existing region would be minimal. One of the complications arising during the September 8, 2011 was the operation of the market under islanding, which eventually led to the market suspension. Therefore, once the market suspension is in place it would be a matter of how to split the system among regions with the risk of having a discriminatory treatment of resources. Furthermore, another concern would be the potential for congestion management among regions with the complication of how to arrive to the congestion prices among the interfaces among the potential different regions. For these reasons and for simplicity in the practical implementation of the administrative pricing, the ISO is proposing to keep only a system-wide administrative pricing. Currently, the administrative pricing used for market disruption is applied system-wide and it there was any congestion observed in the day-ahead market, such congestion and its prices will be preserved with the administrative price.

Another option also suggested in the first round of comments for the administrative pricing under market suspension was to use a pay-as-bid approach. The main challenge for using this approach is the lack of a price for settlements of default load aggregation points since there are no real-time bids for load; the real-time market clears against load forecast not for bid-in demand. Second, one may consider scenarios where no bid information can be readily available to use. One may consider on using the last available bid set but that may lead to similar limitations of the current administrative price of using the last available price. Bids may change across the day and bids in the early morning may not be reflective of the bids for later parts of the bid of the day. The administrative price proposed in this revised version aims to make the process simple and transparent about what price would be used to provide more certainty and transparency in the market place.

Another option suggested in the second round of comments was to define administrative price based on constructing a price that preserves the prevailing conditions. This option would turn out to be quickly intractable because it would require a meaningful set of assumptions to infer that the prevailing conditions would have been. For the time immediately after the suspension, one may think on deriving a price based on the quasi conditions using available last conditions. But this becomes

quickly unworkable once a longer period has elapsed because the snapshot from the beginning will no longer reflect the later conditions. Then ISO would have to come with set of assumptions of what the prevailing conditions and dispatches would have been for that time. It is also important to mention that any price, high or low and different from the day-ahead price, will create collateral implications for settlements. A high price is not the perfect solution because depending on the conditions of an event, the requirement could actually be to decrement generation or shutdown resources.

Finally, with the implementation of the Energy Imbalance market (EIM), there needs to be a consideration for the rules for the areas under the EIM. The rules described here apply only for the California balancing area; the specific rules applicable to any other balancing area under EIM will we scoped and defined in the upcoming stakeholder process for EIM enhancements scheduled to start in November 2014.

3.2.2 System emergencies, Force majeure and settlements implications

Through the discussion of the September 8, 2011 event, there has been some intertwined discussion of system emergencies, market suspension and force majeure. For the sake of clarity in the scope of this initiative, it is important to distinguish such conditions accordingly. A market suspension or system emergency is not necessarily dependent or driven by a force majeure event. Through the discussion in the previous section about the administrative pricing in the context of market disruption and the need for a different approach for administrative pricing for a market suspension. A resource can encounter a force majeure event that is not associated with any system emergency or market disruption.

Force majeure in general refers to conditions beyond the own control of a party. The ISO tariff refers to force majeure as

Force Majeure" shall mean any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's control. A Force Majeure event does not include acts of negligence or intentional wrongdoing by the Party claiming Force Majeure.

The only relief that Section 14 for uncontrollable forces (force majeure) provides is that in case of performing a physical obligation due to force majeure, that failure will not result in a “default” under the ISO tariff. The market participant remains financially responsible and there is no provision in the ISO tariff that would alter the settlement in such circumstances. The ISO market design at its core relies on a two-step settlements between

the financially binding day-ahead and real time markets; the day- ahead market is financially binding. It imposes financial obligations to parties to pay or be paid based on the day-ahead award; if deviations from such awards take place in the real time, uninstructed deviations are settled accordingly. Such mechanism builds the framework for allocating price risk between the day-ahead and real-time markets. If a participant does not deliver its day-ahead award, it has the financial obligation to pay for the uninstructed deviation. When such deviation occurs, the system will rebalance and other resources will move accordingly to supply the undelivered power. When a market participant submits bids into the day-ahead market based on its location, economical strategy and risk premium, among other factors, participants are taking on the risk and consequences of participating in the market under such settlements terms. This rationale is important to consider for the efficient economical operation of a market. The inherent nature of the power system makes outages over which a market participant may not have any control a typical occurrence. The California ISO is no exception to this and on a routine basis the ISO faces transmission outages, including derates, that may disrupt the delivery of power in certain locations of the system. From the point of view of the supplier, some of these outages and derates might be considered beyond the participant's control. The ISO does not believe the ISO tariff should be amended to excuse the settlement impact of settling deviations at the real-time energy price. Doing so would be burdensome to the ISO and undermine the efficiency of the market. First, the ISO would have to consider each instance of failure to deliver on a case-by-case basis. Most importantly, providing settlement relief for non-delivery for circumstances beyond the supplier's control, would render the overall market operation inefficient, because this after-the- fact resettlement would introduce a high level of uncertainty into the market and shift the risk of non-performance to load serving entities that purchased power in the day-ahead market. Even if the ISO were to attempt to craft a very limited set of force majeure circumstances, the complexity is about the factual investigation for each case invoking the force majeure provisions. If a resource participates in the market it is under the known risk associated with it, including the potential risk to not deliver based on its location.

A further degree of complication arises when one considers who should bear the cost of the no delivery. When typical outages impact specific resources, the system will rebalance by requiring other resources to meet the undelivered power and charging any imbalances to the entity that did not deliver. If a resource is excused of its financial obligation for not delivering, then the system will have to absorb the cost of the imbalance. The market already re-dispatched other resources and they were paid accordingly. If the resource that did not deliver is financially excused, then who should bear the cost of the imbalance?

As part of the discussion related to the September 8, 2011 and the reason of the administrative pricing initiative to exist, the ISO committed to clarify the definition of a force majeure event and the settlement consequences. Accordingly, the ISO proposes to make

explicit that force majeure events do not excuse any financial obligation to resources participating in the market.

Furthermore, for the cases where the ISO is suspending the real-time market like the one observed on September 8, 2011 and regardless of whether the system emergency is due to a force majeure or not, there need to be the proper conditions and incentives for resources responding to the conditions and helping to resolve the system emergency. The administrative pricing used under such conditions is a driver for this, and the settlements implications need to be defined. Specifically,

i) For the real-time market, for physical resources and with the proposal to use day-ahead prices, there will be no imbalance charges as the real time market prices will match the day-ahead prices. For resources being impacted by the event, such as tripped load and generation, the use of the day-ahead prices will wash out any imbalance charges. For those resources receiving specific operating order they will get the standard bid or better payment used currently for exceptional dispatches, which is no more than the better of either the market price, bid-in price or default energy bid. Since the real-time market will be suspended the proposal is to use also the bids and default energy bids from the day-ahead market for this purpose. These bids will naturally align with the prices also used to settle the real-time market. Resources elsewhere in the system that will not be affected by the event leading to the market suspension will be able to fulfill their obligations, and to the extent they do it they will be able to manage their financial positions with respect to the day-ahead obligations. If there are resources that are not able to recover their costs due to the administrative price imposed, they will receive standard bid cost recovery using the bids from the day-ahead market. When the day-ahead market is not available, but the real-time market is running, and the ISO defaults to use previous day, such day-ahead awards and prices will be used to settle accordingly the day ahead, and real-time prices and schedules produced from the real time market will be settled with real-time prices, like any standard day for settlements. When both the day-ahead and real-time markets are suspended, the ISO defaults to use previous day for schedules and awards for the real time and then in real time manual operating instructions will be followed. This means that day-ahead and real-time prices will be the same and there will be no imbalance charges.

ii) When the market is suspended and an administrative price is being used, administrative prices will have an impact on financial products. The approach proposed below is to recognize that during a market suspension, an administrative price is being used, and such purely financial products may observe unintended settlement effects –either gains or losses- that have no relationship to their

positions. The proposed settlement considerations aim to target the various financial products, including

a. Congestion revenue rights. Congestion revenue rights are settled on the marginal congestion component produced in the integrated forward market. If the ISO was unable to produce a market solution for the day-ahead market, and as indicated above, and the ISO default to use previous day-ahead schedules and prices, CRR will be settled on previous day-head prices because the energy market will still be settled at the day-ahead prices and therefore CRRs are need to complement the exposure to the day-ahead congestion. If on the other hand, the ISO takes the option of not having the day-ahead solution but rather leave fully up to the real-time market, the ISO will fully settle the market based on the real time market. This means that effectively the prices and awards of the day-ahead market will be zero. The settlement implications for congestion revenue rights are that this will effectively neutralize the congestion revenue right transactions. Effectively, all congestion revenue rights will be settled at zero prices. This is needed because the CRRs are released ahead of the day-ahead market and, therefore, there will be CRRs to be settled for.
b. Virtual bids. There may be two different scenarios impacting convergence bids. Since convergence bids are cleared within the day-ahead market, in the case of a day-ahead market suspension there will be no convergence bids cleared -nor will physical bids be cleared-, i.e., awards and prices for convergence bids will be zero. Depending on the actions taken by the ISO for the real time purpose, there is a consideration to make for convergence bids. As described above, the ISO is proposing to either use previous day-ahead results or leave all up to the real-time market depending on the conditions and challenges determine by operations of the system. In case the ISO determines that the DAM results from previous day will be used, the intention is to provide the real time market with a starting point to dispatch physical resources; this needs to be complemented for physical resources with the corresponding settlements. However, there is no operational need to have virtual transactions copied from previous day and then settled them with real-time prices. For this reason if there is a day-ahead market suspension and the ISO defaults to use previous day-ahead results, convergence bids will be suspended for that day, and only physical resources will be settled using awards and prices from previous day-ahead and the schedules and prices produced by the real time, like the settlements under any normal day. IF the ISO determines that instead there will be effectively no day-ahead results and leave everything up to the real time market, for convergence bids there are no

settlement implications because for that day, there will be no awards for convergence bids to settle. Thus, there will be no further settlement implications. In the case of a market suspension for the real time market, the convergence bid transactions will be neutralized by equalizing the real time prices to the day-ahead prices.

4 Priority of self schedules with existing transmission rights

4.1 Issue

Currently, all existing transmission contract (ETC) and transmission ownership rights (TORs) are exempt from any congestion charges for their schedules in the day-ahead and real-time market. The ISO does not reserve the capacity associated with such rights on internal locations but does so for such rights at the interties. Scheduling coordinators must submit specific types of self-schedules in order to be eligible for such treatment. These ETC/TOR self-schedules are validated through a market application in SIBR, which ensures that only holders of such rights receive the exemption from congestion charges by validating that the ETC/TOR self-schedules are associated with specific contract reference numbers. In the past, the ISO has observed cases where a market participant submitted an ETC/TOR self-schedule but used an erroneous contract reference number, in which case the wheel through becomes unbalanced and the ETC/TOR self-schedule loses its scheduling priority and are treated as the self-schedules are passed to the market system as regular price taker self-schedules, producing unintended consequences for the market as well as the ETC/TOR holder.

If a self-schedule is passed on to the market as a price taker when it was intended to be an ETC/TOR, the price taker bid may clear with high prices when the available capacity is not sufficient to accommodate such price taker self schedules in addition to the reserved capacity from ETCs/TORs. Depending on the self-schedule and available capacity, the clearing price (which in some instances may be extreme) may expose other market participants to congestion charges or congestion revenue rights charges simply because of an error by another participant.

The ISO does not implement price corrections in such instances because it was a bid-in error from a participant, and this is a category for which the ISO does not correct prices. This unintended outcome creates an issue for some other participants that now have to absorb high congestion costs, creating uncertainty in the market.

4.2 Straw Proposal

ISO market participants with ETCs or TORs are entitled to use their rights but must comply the ISO bidding and scheduling practices set forth in the ISO tariff and business practice manual. When an error occurs during the bid submission, the SIBR application provides participants with the errors and flags to identify the bid submission issues to correct. Participants therefore are responsible for ensuring the correctness of their bids. The ISO intends to modify this logic in SIBR so that if a scheduling coordinator submits an erroneous contract reference number (CRN) or fails to pass the SIBR validation rules due to a zero entitlement, the ETC/TOR self-schedule will be rejected rather than being passed through like a regular self schedule. The CRN is validated before any entitlement is accepted. CRN's are registered with the ISO for each contract and SIBR validates that the proper CRN is used for the resources designated to the contracts and applicable CRNs with the TOR/ETC self-schedule. There is also a validation for the TOR/ETC self-schedule not to exceed a registered maximum for the resource. Going forward, the new procedure would reject the ETC/TOR self-schedule if either the CRN is misused or if the maximum amount for the applicable contract is exceeded. As part of the process of not considering an invalid ETC/TOR self-schedule, the ETC/TOR rights will not be released. Participants will be notified that the scheduled is rejected and can fix the error if they so choose. This will both provide a clearer signal to the bidder that an error has occurred as well as mitigate the issue of potential congestion associated with erroneous the ETC/TORs self-schedules when later during the market clearing the ISO determines that there isn't sufficient market capacity to clear the price taker self-schedules. In some historical cases the market had to curtail such self-schedules to enforce the feasibility of the tie limits. This change will take place only in the SIBR application and will not require any change in the upstream market application.

5 Compounded pricing of multiple contingencies

5.1 Issue

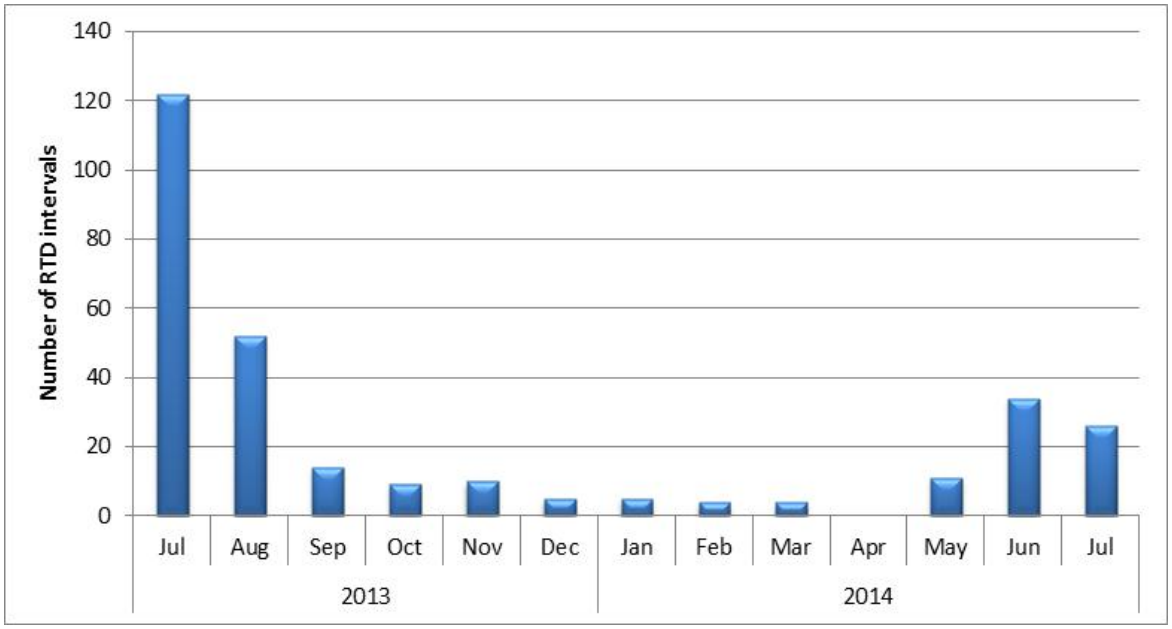
The ISO market systems contain a number of transmission constraints that are enforced in the through the formulation of its security constraint dispatch for both the base and contingency cases. The market system makes use of a series of pricing parameters that when they are binding indicate the cost associated with relaxing these constraints. Since 2013, with the introduction of more contingency-related constraints and with tighter conditions in the system, there have been several instances where a transmission constraint is binding for base case and/or multiple contingency cases. The ISO has observed cases where the solution is the constraint-relaxation region because there are insufficient economic controls (variables) to manage the congestion on the transmission constraints using only economic bids. When this occurs, the same constraint may be binding and relaxed for the base case and/or multiple contingencies cases. Each of these cases will reflect a shadow price associated with the relaxation. Since each contingency case is treated as a separate constraint, each contingency and base case will have a shadow price that will in turn be reflected accordingly in the marginal congestion component of the various locations based on the shift factors thereby compounding the cost of the congestion component of the LMP. For the instances where the solution is based on the administrative constraint relaxation parameters, such pricing of compounded congestion may not be sending a proper price signal. Rather, it is a by-product pricing of the multiple relaxations based on the administrative relaxation parameters prices. Under these conditions, it is expected that only the most severe contingency would be binding and priced.

5.2 Straw Proposal

The ISO establishes the set of contingencies to be used in each market run based on operations engineering studies. The ISO conducts a pre-screening process to determine which contingencies to enforce and it is challenging in that process to determine the single limiting/severe contingency that should be enforced when in most cases a set of contingencies are all credible and which one becomes the most limiting in any market interval depends on the specific system conditions, which is inherently dynamic. Therefore, in several of the instances observed in the past, it turns out that all enforced contingencies were valid and equally credible and the most limiting cannot be identified *ex-ante*. Intuitively, one can consider a mechanism within the market application to programmatically pre-screen and identify the most severe contingency so that the market would enforce only that specific contingency. Under such a construct, any other contingency would not be enforced at all in the market and, therefore, any redispatch for its management would not materialize.

Conceptually, there may be scenarios where the controls (resources) to manage one contingency may be basically the same effective controls to manage another contingency for the same protected element. From a practical perspective, such a construct could not be developed without a major redesign of the ISO market software because. Based on historical occurrences observed in the California ISO market, the cases of concurrent contingencies binding with constraint relaxation have been the most frequent occurrence. Figure 1 shows the number of intervals (frequency) in the real time interval dispatch of constraints binding concurrently for the last 12 months.

Figure 1: Frequency of RTD intervals experiencing concurrent binding of contingencies



Because of these observations and the potential major changes to the market software, the ISO is proposing to confine the scope of this enhancement only to instances where a constraint relaxation occurs for multiple contingencies. In the future, the ISO may explore the cost-benefit of further expanding this application to other scenarios of multiple contingencies binding in the absence of constraint relaxation.

The enhancement in this proposal consists of a modified logic in the market application that would effectively result in pricing only the most limiting contingency under constraint relaxation conditions. All contingencies would still be enforced as usual; however, the current logic which requires that a constraint to be relaxed as a result of multiple contingencies using a slack variable per constraint will be modified so that only one common slack variable is used in the definition of a transmission constraint associated with different contingencies. For illustration, let us consider a cost-minimization problem in its simplest expression to capture the core of the modified logic,

$$
\begin{aligned}
\min \quad & \sum_j c_i(x_i) \\
s.t. \quad & \sum_i x_i = d \\
& \sum_j a_{kj}^c x_j \le b_k^c, \quad \forall k, c \\
& 0 \le x_i \le \overline{x}_i, \qquad \forall i
\end{aligned}
\tag{1}
$$

where injections at location *i* are defined by variables x_i and upper limits $\overline{x}_i$; parameter *d* stands for demand, parameter a_{kj}^c stands for the shift factor associated with transmission constraint *k* and location *j* for contingency case *c*; the base case is generally enumerated with c=0, while any other contingency are enumerated starting with c=1. Transmission limit for constraint *k* is defined with parameter b_k^c; the limit for constraint *k* will take only either of two values, one for the base case c=0 and another for the contingency cases, which refers to the emergency limit, *i.e.*, $b_k^{c=1} = b_k^{c=2} = b_k^{c=3} \ldots$.

In the current ISO market formulation, this standard problem is expanded for the scheduling run to account for potential relaxation of transmission constraints by introducing a slack variable s_k to each transmission constraint and then appending these slack variables into the objective function which yields the following LP problem:

$$
\begin{aligned}
\min \quad & \sum_j c_i(x_i) + \sum_{k,c} \delta_k s_k^c \\
s.t. \quad & \sum_i x_i = d \\
& \sum_j a_{kj}^c x_j - s_k^c \le b_k^c, \quad \forall k, c \\
& 0 \le x_i \le \overline{x}_i, \qquad \forall i \\
& s_k^s \ge 0, \qquad \forall k
\end{aligned}
\tag{2}
$$

The slack variables are penalized in the objective cost function with the corresponding constraint parameters prices as defined in the ISO tariff and the Business Practice Manual for Market Operations. The modified definition of the transmission constraints with the proposed enhancement will now be as follows:

$$
\begin{aligned}
\min \quad & \sum_j c_i(x_i) + \sum_k \delta_k s_k \\
s.t. \quad & \sum_i x_i = d \\
& \sum_j a_{kj}^c x_j - s_k \le b_k^c, \quad \forall k, c \\
& 0 \le x_i \le \bar{x}_i, \qquad \forall i \\
& s_k^s \ge 0, \qquad \forall k
\end{aligned}
\tag{3}
$$

The only difference is in the treatment of the slack variable; currently, there is a slack variable per constraint, including one slack variable per contingency constraint; the modified approach uses only one single slack variable for the base constraint and all the associated contingency constraints. This common slack variable will be also appended in the objective function only once, which means the relaxation will be priced only once.

Even though a transmission constraint will be modeled individually for each contingency, they will have a common slack variable for transmission relaxation. So when a relaxation occurs, only the most limiting constraint will determine the amount of required relaxation and any other contingency related constraint that is less severe will be under this relaxed limit and, thus, will not be binding. It is important to note that this will make a difference only when the market relaxes a transmission constraint associated with contingencies; if the market solution is solving within the economical range, the market solution attained with this enhancement will be no different from the solution attained with the current logic. The ISO is proposing to adopt this approach as this option will address the majority of instances observed in production at a relatively easy to implement solution.

6 Multiplicity of prices

6.1 Issue

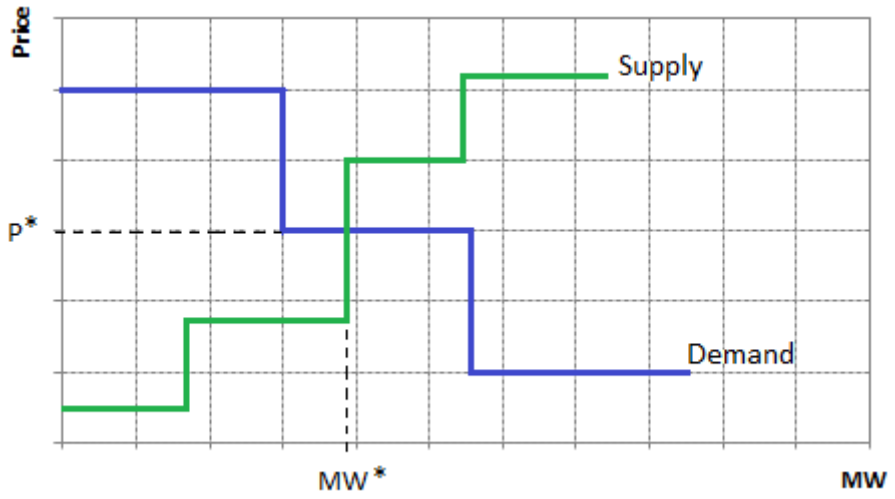
The California ISO LMP market design, like many other successful electricity market designs in the United States and elsewhere, is founded on a bid-based security constrained unit commitment and multi-interval economic dispatch. The economic dispatch produces optimal schedules (megawatts) and locational marginal prices (LMPs) that clear the electricity market. The prices arise as a natural by-product of the optimization, and have a traditional economic interpretation of the market clearing prices. The optimization produces a least-cost solution considering not only bid-in information from participants but also system, resources and operational constraints, including power balances, inter-temporal constraints and transmission limits, as well as co-optimizing energy and ancillary services.

Locational marginal prices (LMPs) contain three components: system marginal cost of energy, marginal cost of congestion and marginal cost of losses. Marginal cost of congestion originates from the various transmission-related constraints enforced in the system, including nomograms, flowgates, branch groups and interties. The core of the optimization relies on a security constraint unit commitment (SCUC) and is solved with a mixed integer programming (MIP) methodology. The use of the MIP technique allows the ISO to effectively deal with numerous market design elements of the California ISO markets. Both the tariff and the various business practice manuals of the ISO provide details and descriptions of the basic economic and market principles in which prices are based on the clearing of supply and demand.

In an ideal market clearing process, prices are optimally set at the point where the downward sloping demand curve and upward sloping supply curves intersect. Ideally, such supply curves are smooth and their intersecting point defines the market equilibrium point with the cleared price and quantity. This point maximizes the market surplus. In this typical situation, the marginal cost ($/MWh) of meeting the next increment of demand can be identified by moving along the upward sloping supply curve. However, this simplistic characterization of supply and demand curves does not hold for electricity markets with step-wise bidding structure. A common feature of electricity markets is the flexibility to use multi-segment bids, usually multi-step-wise bids. This is needed to reflect closer the nature of generation costs and benefits for demand. This step-wise format breaks the smoothness of the price curves even when they are monotonically increasing for supply and decreasing for demand that may lead to singular conditions when defining the market clearing point because the intersecting point of stepwise curves may lie at a horizontal or vertical segment of the curves, or may not intersect at all. Figure 2 shows a typical step-wise supply and demand

curves and the market clearing point where both curves nicely intersect at one single point *(MW*,P*).*

Figure 2: **Supply and demand curves with a unique market clearing point**



These stepwise curves are not smooth but they are monotonically increasing for supply and monotonically decreasing for demand. In this particular case where such curves intersect the market equilibrium results in unique clearing price and quantity obtained through an economic dispatch. Simply looking at the figure, it is clear that there may be other instances where the supply and demand curves intersect at more than one point, such as intersecting at the vertical or horizontal sections where there can be multiplicity of possible prices or quantity solutions, all of which may be mathematically optimal based on the market clearing process.

The usual emphasis in discussions of locational market-clearing prices focuses on the sometimes counterintuitive nature of network interactions. However, there are other features of bid-based markets that can create counterintuitive results for market prices even without the impact of network interactions. An example, but not the only one, of such solutions is the so-called “degenerate” pricing conditions that can arise with bids and offers expressed as step functions and result in multiple market-clearing prices under economic dispatch.

The security constrained economic dispatch is an optimization problem of maximizing the benefits defined by sum of demand bids costs minus the cost of supply offers subject to a number of operational, system and transmission constraints. Mathematically the optimization

takes the form of a linear programming problem. In linear programming (LP) applications, marginal or shadow prices are as economically important to calculate as the optimal values of decision variables and the objective function. In mathematical terms, the shadow price represents how much the objective function will change if we relax a given constraint. This is often called the *marginal value*, *shadow price* or *dual variable*, associated with the constraint. The market clearing prices are obtained from the solution of the linear programming problem as shadow prices of the energy and ancillary services requirements, inter-tie, and other transmission and operational constraints.

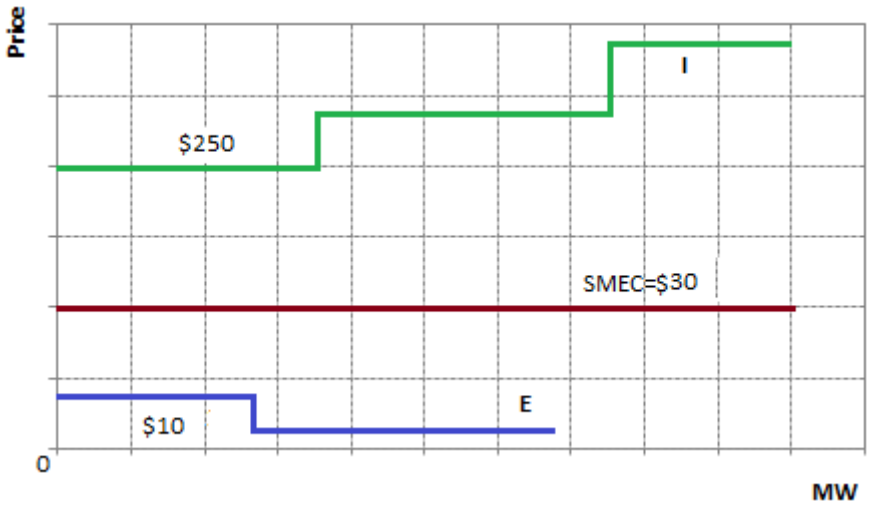
Although degenerate cases lead to multiplicity of possible solutions, any of these solutions is still optimal. Degeneracy cases are not unique to electricity markets. Degeneracy is rooted to the mathematical formulation and (pricing) optimization of a physical problem and is a well-known and understood condition regardless of the industry in which the condition may arise. Linear programming commercial software products often produce only one of the optimal solutions but many others may also exist, and in the case of electricity markets, only one solution can be used and is desirable.

Among the various constraint considered in the California ISO's market model, there is one set of constraints incorporated to monitor and enforce imports and exports through the various interfaces connecting the ISO system with adjacent balancing authorities, known as *interties (i.e.,* the Intertie Constraint or ITC). The constraints on these interties are in place to enforce scheduling limits rather than power-flow limits. Each intertie has a constraint associated with the capacity in the import direction and another with the export direction. Imports and exports for energy are netted with each other. These constraints are enforced through the market and when binding (i.e., the schedules equal the constraint limit) they may have associated shadow prices. These shadow prices are reflected in the marginal congestion components at specific scheduling point locations for the given intertie. Under certain system conditions, the intertie limits may be at 0 MW in either or both directions. When both directions are set to 0 MW, the instance is referred to as *open tie* condition and no schedules can come through in either direction. There may be other instances where only one direction is derated to 0 MW, which means that the other direction may still have a non-zero limit and thus schedules may still come through; these instances are referred to as *partially open tie*. Although degeneracy may arise from various interplays and forms, this stakeholder effort focuses on the particular cases of interties in the California ISO markets.

Figure 3 illustrates a specific scenario observed in historical outcomes for an instance of a partially open tie derated at 0 MW in the export direction while the import limit is greater than 0 MW. This case is selected for this discussion to illustrate the interplay between the partially open tie situation and the bids submitted to the market in those hours. For the sake of simplicity the MW break points in the stacks are omitted, and only the bid-in prices for the first segment of the imports and exports are shown. These numbers are not real but preserve

the structure and interplay of the real cases. The import stack for this intertie is represented in green while the export stack is represented in blue.

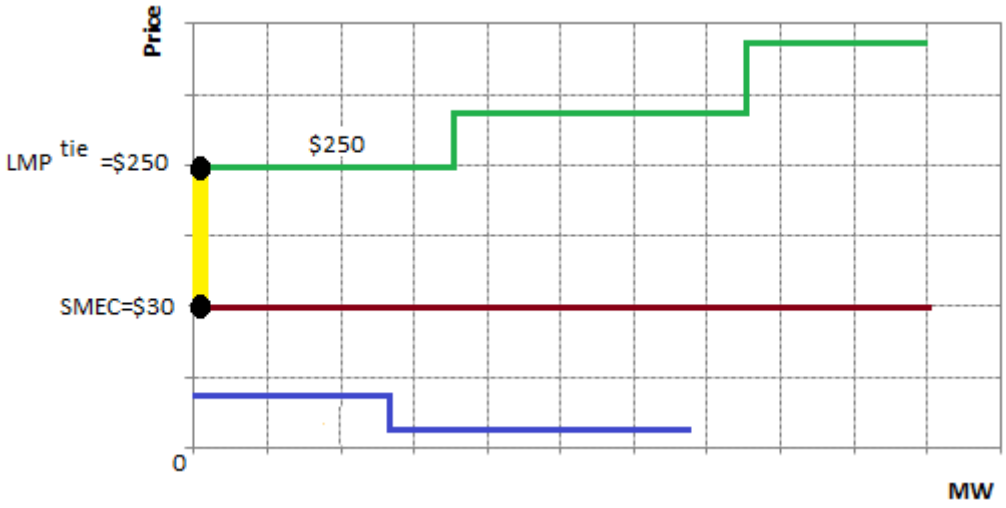
Figure 3: **Bid stack for imports and export for an intertie with to 0 MW in the export direction**



The market solution attained a system marginal energy cost of $30. Given that the import bid is higher than the system energy marginal cost, no imports were awarded on this intertie, and no exports are awarded in the export direction because it is derated to 0 MW and they are not in merit order. In terms of awards this is an expected optimal MW dispatch; however, in terms of prices, this condition leads to a degenerate solution with multiplicity of prices. The import bids set the price at the intertie location at $250 and the shadow price for the intertie constraint is set at ($30-$250)= -$220 in the export direction in order to balance with the system energy price of $30. This means the intertie constraint is binding in the export direction at the 0 MW limit. The set of multiple prices is bounded on one end by this outcome where the export constraint is binding at -$220, the other bound would be when such constraint is binding at a zero shadow price[6]. This is shown graphically in Figure 4. For any price in this range, the optimal dispatch still holds the same, which is at 0 MW awards for both imports and exports. For the actual market solution, the optimization solver independently selected the value at the upper bound of the shadow price for the market solution.

[6] The 0 MW limit creates conditions for a weak complementarity slackness. Under strict complementarity, if the constraint is binding its associated shadow price will be non zero; for weak complementarity, if the constraint is binding it shadow price may be non zero or zero (J. Nocedal and S. Wright, Numerical Optimization, Springer, 1992).

Figure 4: **Multiplicity of prices for an intertie constraint derated at 0 MW in the export direction**



This degenerate outcome with a multiplicity of prices does not pose a complication in the context of this energy market solution as there are no awards to settle at such prices, whatever the prices turn out to be. Any of the prices within the indicated range are equally optimal and have their root in the mathematical formulation and marginal pricing of the constraint. Any of the prices within the indicated range are equally optimal and have their root in the mathematical formulation and marginal pricing of the constraint. The complication arises when such prices are used outside of the physical energy market. In the case of the day-ahead market, for instance, such prices may have an impact on the settlement of congestion revenue rights (CRRs).

6.2 Straw Proposal

The ISO did not contemplate or adopt specific rules to be incorporated in the market application to identify and select *ex ante* one price over the others from the feasible set of prices in degeneracy cases. The optimization solver of the market selects one price out of the many feasible prices and produces that as the final outcome. It is important to note that the multiplicity of prices and the choice of one of them as the solution is not an erroneous result and does not mean the market application or its solver are working incorrectly. This is simply the inherent nature of the pricing model and optimization, and the only way to overcome this outcome is to use an enhanced pricing formulation. Given the concerns with degenerate solutions and multiplicity of prices under the traditional formulation for pricing constraints

with a security constraint economic dispatch, the ISO has worked with its software vendor and developed a possible alternative for addressing such degenerate cases.

The proposed approach relies on modifications to the mathematical structure of the linear programming security constrained economic dispatch currently used in its markets to ensure convexity of the objective function and uniqueness of prices. To put in context the proposed modifications, let's define first the current formulation in its simplest expression with the following linear programming problem:

$$\begin{aligned} \min \quad & \sum_j c_i(x_i) \\ s.t. \quad & \sum_i x_i = d && (\lambda) \\ & \sum_j a_{kj} x_j \le b_k, \quad \forall k && (\mu_k) \\ & 0 \le x_i \le \overline{x}_i, \quad \forall i && (\overline{\pi}_i) \end{aligned} \tag{4}$$

This LP problem stands for the minimization of bid-in cost for supply subject to constraints of power balance, transmission limits and supply limits, respectively. Supply is defined with variables x_i and upper limits $\overline{x}_i$; parameter *d* stands for demand, parameter a_{kj} stands for the shift factor associated with transmission constraint *k* and location *j*; transmission limit for constraint *k* is defined with parameter b_k; the variables in brackets in the right hand side of each constraint are their associated dual variables. In the current ISO formulation, this standard problem is expanded for the scheduling run to account for potential relaxation of transmission constraints by introducing a slack variable s_k^s to each transmission constraint and then appending these slack variables into the objective function which yields the following LP problem:

$$\begin{aligned} \min \quad & \sum_j c_i(x_i) + \sum_k \delta_k^s s_k^s \\ s.t. \quad & \sum_i x_i = d && (\lambda) \\ & \sum_j a_{kj} x_j - s_k^s \le b_k, \quad \forall k && (\mu_k) \\ & 0 \le x_i \le \overline{x}_i, \quad \forall i && (\overline{\pi}_i) \\ & s_k^s \ge 0, \quad \forall k \end{aligned} \tag{5}$$

The slack variables are penalized in the objective cost function with the corresponding constraint parameter prices as defined in the Business Practice Manual for Market Operations.

Similarly, in the pricing run the problem is expanded to account for any potential relaxation that took place in the scheduling run.

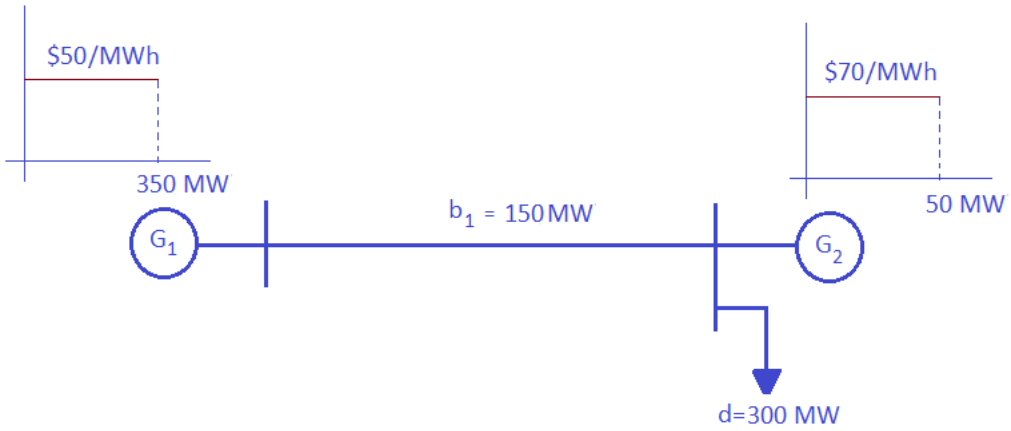
$$
\begin{aligned}
\min \quad & \sum_j c_i(x_i) + \sum_k \left(\delta_k^p s_k^s + \delta_k^p s_k^p \right) \\
s.t. \quad & \sum_i x_i = d && (\lambda) \\
& \sum_j a_{kj} x_j - s_k^s - s_k^p \le b_k, \quad \forall k && (\mu_k) \\
& 0 \le x_i \le \overline{x}_i, && \forall i \quad (\overline{\pi}_i) \\
& 0 \le s_k^s \le \hat{s}_k^s, && \forall k \\
& 0 \le s_k^p \le \varepsilon^l, && \forall k
\end{aligned}
\tag{6}
$$

where $\hat{s}_k^s$ is the amount of relaxation determined in the scheduling run for transmission constraint *k* that now serves as an upper bound to the first-segment slack variable in the pricing run; additionally, the pricing run uses a second-segment slack variable s_k^p which is limited by an epsilon amount ε^l. The cost of moving these slack variables to regain feasibility in the system by relaxing the transmission constraint is defined by the corresponding penalty prices used currently in the ISO markets system.

The alternate formulation proposed by the ISO relies on expanding the current formulation with another slack variable with an associated weight ω^q ,casting the problem as a quadratic programming problem. The linear transmission constraints are expanded with a penalized slack variable while a quadratic penalized term is added to the objective cost. With these modifications, the traditional security constraint economic dispatch casted as a linear programming problem is converted into a quadratic (convex) programming problem. The problem is strictly convex and separable with respect to the slack variable and, therefore, it can guarantee the uniqueness of prices. In addition, the resulting prices are continuous functions of the problem parameters. Thus, small changes in the problem parameters, such as the constraint limits, will only result in smooth changes in prices. This alternate formulation addresses the multiplicity of shadow prices and also eliminates the potential steep changes in prices when there are small changes in the requirements or conditions.

The additional slack variable introduced in the formulation will compete with the existing slacks s_k^s, s_k^p to fulfill the relaxation required. The slack variables s_k^s, s_k^p contribute linearly to the relaxation of the constraint limit, but their impact on the objective cost function also grows at a constant rate as defined by the penalty price for transmission relaxation. Additionally, with a weight ω^q associated with the slack variable, the growth of new slack variable's contribution to the objective cost function is also limited even if it increases quadratically. If the weight is relatively large, the slack variable effect will be cheaper to use than the slack variables for the linear terms priced at the high penalty price, and the optimization will lean more on that slack for small relaxations. This outcome, however, will result in the slack variable for the quadratic term setting the price potentially at prices that will not reflect the conditions of constraint relaxation. In order to preserve the price signal of constraint relaxations, the weight needs to be sufficiently small. The ISO has done preliminary testing of this proposal pricing mechanism and has found that a weight in the order of 1.E-5 preserves the proper pricing.

Consider the following set-up of a two-node system where the demand of 300 MW cannot be met with the local generation; the transmission constraint also imposes a limit on generator 1 to meet the load. Under this scenario consider that the transmission constraint is allowed to be relaxed in order to meet the demand.



The slack variable in scheduling run will allow the flow on line 1 to violate the limit at a penalty price of $5000/MWh. The solution to the scheduling run results in generator 1 producing 250 MW, generator 2 producing 50 MW; this represents a flow on line 1 of 250 MW, which is feasible by allowing a relaxation of the transmission constraint of 100 MW, and means the slack variable s_1 has a value of 100 MW. In terms of prices, the shadow price μ_1 associated with the transmission constraint of line 1 is -$5000/MWh and the shadow price of the power balance, which is the system marginal energy component, is $5050/MWh; this means the locational marginal price at the locations of generators 1 and 2 is $50/MWh and

$5050/MWh, respectively. These resulting prices reflect the relaxation of the transmission constraint at the penalty price.

Turning into the pricing run formulation, the problem becomes

$$
\begin{aligned}
min \quad & 50G_1 + 70G_2 + 1000s_1^s + 1000s_1^p \\
s.t. \quad & G_1 + G_2 = 300 && (\lambda) \\
& G_1 - s_1^s - s_1^p \le 150 && (\mu_1) \\
& 0 \le G_1 \le 350 \\
& 0 \le G_2 \le 50 \\
& 0 \le s_1^s \le 100 \\
& 0 \le s_1^p \le 0.1
\end{aligned}
\qquad (7)
$$

where s_1^s is limited by the amount of the relaxation from the scheduling run; i.e. 100 MW, and s_1^p is limited by an epsilon amount. The cost of moving one unit of either of these slack variables is set to $1000 based on the current values of penalty prices used in the markets for transmission constraint relaxation in the pricing run. The solution of this problem is G_1 = 250 MW, G_2 = 50 MW, flow on line 1= 250 MW, s_1^s = 100 MW, s_1^p=0 MW. The system marginal energy price is $1050/MWh, the shadow price on the flow constraint with the slack is -$1000/MWh. The LMP at the locations of generators 1 and 2 are $50/MWh and $1050/MWh, respectively. The prices reflect the fact that the flow constraint on line 1 cannot be satisfied and the penalty cost of violating the constraint, which is based on the administrative transmission relaxation price of $1000/MWh.

The proposed formulation will cast the problem into a quadratic programming program. Assuming that the weight ω^q is set to a very small positive value of, say, 0.0001, the solution to this problem is G1 = 250 MW, G2 = 50 MW, flow on line 1 = 250 MW. The system marginal energy price is $1050/MWh, the shadow price on the flow constraint with the slack is -$1000/MWh. The LMP at the locations of generators 1 and 2 are $50/MWh and $1050/MWh, respectively. This is the expected result consistent with the goal to set shadow prices for infeasible transmission constraints according to the transmission relaxation price of the pricing run, i.e. $1000/MWh.

In order to illustrate the discussion of the effect of the epsilon on the market solution, consider the summary of market results using different values for the weight as shown in Table 2.

Table 2: Comparison of market solutions with different weight values

ω^q	G_1	G_2	LMP_1	LMP_2	λ	μ_1
10	300	0	50	65	65	-15
1	250	50	50	150	150	-100
0.1	250	50	50	1050	1050	-1000
0.01	250	50	50	1050	1050	-1000
0.001	250	50	50	1050	1050	-1000

In the first two cases where the weight is set to a large value, the relaxation relies on the slack variable of the quadratic term and also defines prices that do not reflect the relaxation condition. Only in the cases with the weight set to a value of 0.1 or lower the shadow price and LMPs reflect the actual conditions of constraint relaxation.

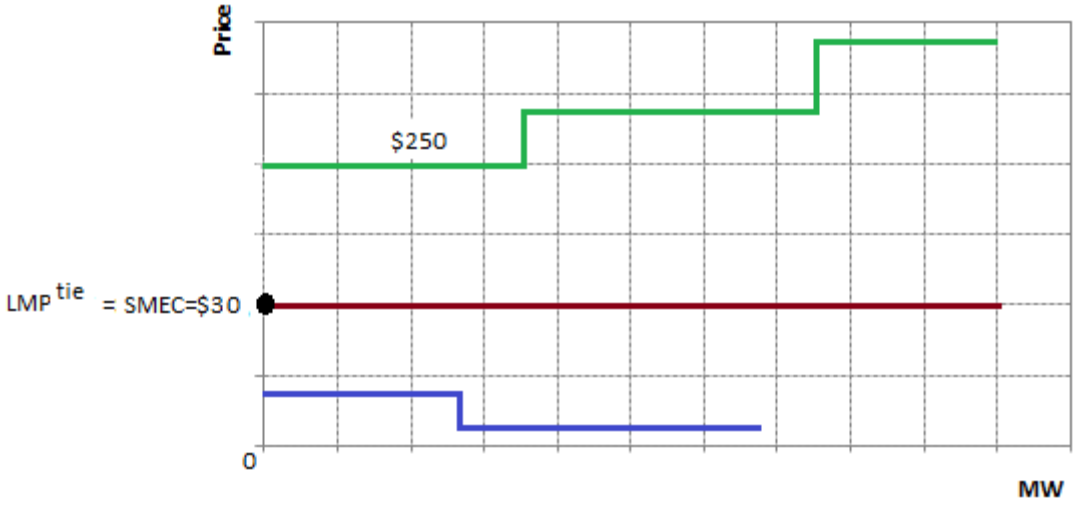
The proposal for using this alternate formulation is applicable to both the day-ahead and real-time markets and only in the pricing run of the markets because this is the run that generates the binding schedules and prices. Also, the ISO intends to apply this formulation to constraints that impact the locational marginal prices for energy, including power balance constraint and transmission constraints such as interties, branch groups flowgates, nomograms, and energy imbalance market related transmission constraints (EIM transfer, GHG and NSI constraints) . Similar to the treatment of the existing slack variables for transmission relaxation, the expanded model with the new slack variable will always be modeled in the constraints regardless of the potential scenarios of constraints binding or being slack or whether the constraint may be binding or not in the scheduling run. There is no differentiated treatment of constraints due to specific conditions between runs or constraints. The formulation is expanded systematically for all constraints as part of the static model and will always model the existing slack variable and the new added slack variables. In cases where the constraint is slack (under the limit), having the new slack variable, or even the existing slack variable, will make no difference in the outcome.

With respect to how this proposed change interacts with the other enhancement for compounded congestion to price only the most limiting constraint, the only change to the slack variable set-up is the use of a common slack variable; the current treatment of the slack variable in both the constraint definition and objective cost function will remain the same, and with the enhancement for contingencies there will be only one slack variable for the set

of base case and contingencies appended into the objective cost function which will be priced once at the penalty price. All this while the enhanced formulation for multiplicity of prices will have a new slack variable in addition to the current use of the existing slack variables.

Figure 5 illustrates the market solution using the alternate formulation in which the LMP at the intertie scheduling point is equal to the system marginal energy cost, which in turn results in no congestion on the intertie in the export direction. These numerical examples are from actual production cases observed in the past; only the specific bid values were modified to not reflect the actual bids.

Figure 5: Market solution at the intertie with alternate pricing

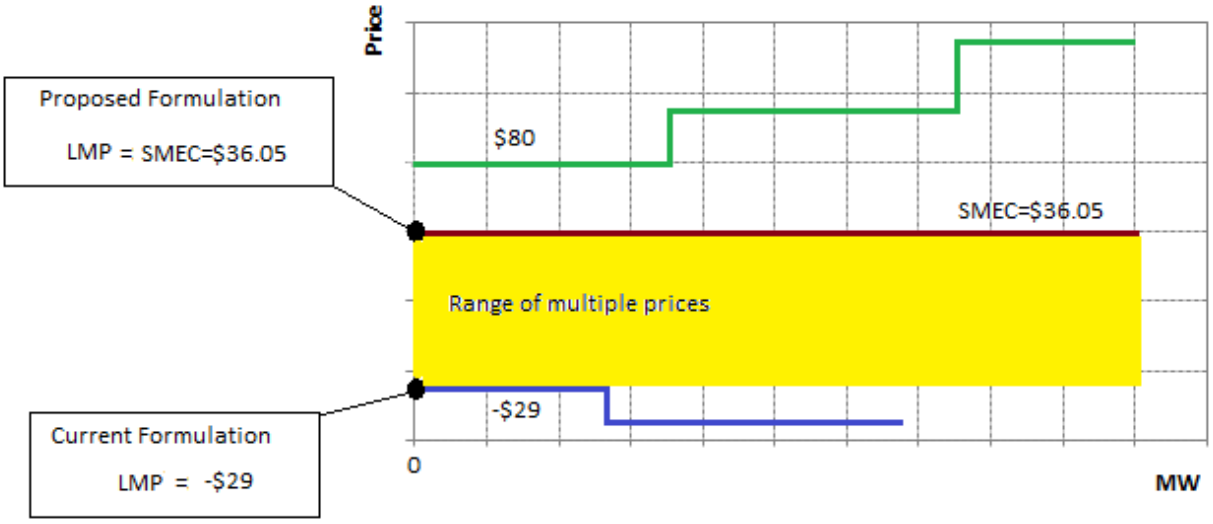


Note that this solution is the result of the alternate formulation of the optimization problem, and is not based on any new logic instructing the solver to pick any particular solution of the set of multiple optimal solutions. The enhanced formulation actually solves to a single market outcome, thereby eliminating degeneracy. This no-congestion outcome still results in the same optimal dispatch as the old formulation but avoids the multiplicity of prices. This solution is also consistent with system operations in these scenarios.

In contrast, consider an alternative scenario where an intertie is derated to 0 MW in the import direction and the export limit is non zero. The bid setup is presented in Figure 6 with the import stack represented in green and the export stack represented in blue. In this case there are no awards in either the import or export direction. In the current formulation the price at the intertie location is set by the export at -$29. With the system price at $36.05, the price differential between the system price and the tie price is defined by the congestion on the intertie at a shadow price of -$65.05. Like in the previous example, this case also leads

to degeneracy and multiplicity of prices. The current formulation provides a market solution at the lower bound of the set of degenerate prices, which is the maximum level of congestion the intertie in the export can observe. The proposed formulation would clear the price at the intertie location equal to the system price of $36.05, leading to no congestion on the intertie. The optimal dispatches in either case are still 0 MW for both imports and exports.

Figure 6: Illustration of an intertie derated to 0 MW in the import direction



7 Stakeholder feedback

The ISO's responses to stakeholders' written comments can be found at the Pricing Enhancements initiative webpage. In several instances, the ISO referred to this revised paper for a reference of how the ISO has incorporated the comments and responses.

8 Next Steps

The ISO will discuss the issue paper with stakeholders during a teleconference to be held on November 6, 2014. Stakeholders should submit written comments by November 13, 2014 to PEnhancements@caiso.com

Attachment E – Board Memorandum

Tariff Amendment to Implement Administrative Pricing Policy and Tariff Clarifications
California Independent System Operator Corporation

November 23, 2016

Memorandum

To: ISO Board of Governors

From: Mark Rothleder, Vice President, Market Quality & Renewable Integration

Date: December 10, 2014

Re: **Decision on pricing enhancements proposal**

This memorandum requires Board action.

EXECUTIVE SUMMARY

Management proposes market rule changes to improve pricing efficiency in four areas: administrative pricing rules that apply when market clearing prices are not available; validation of self-schedules supported with transmission contract or ownership rights; formulation of contingency-related constraints; and formulation of market constraints to ensure unique market clearing prices.

Administrative pricing is used during market disruptions or suspensions for when prices cannot be generated through its normal market clearing mechanism. After the September 8, 2011 southwest outage, the ISO committed to revise its administrative pricing rules that would apply for similar system emergencies or market disruptions. The ISO launched this effort in August 2012, and resumed it in June 2014 as part of a broader stakeholder process that led to the proposed changes. The current rule is to use the last available price produced in the market, referred to as the "last best price." Management now proposes a tiered approach for administrative pricing that will provide simple and practical rules and price certainty, and have minimum impact on the market as a whole. The proposal also addresses settlements implications for both physical and financial resources and will clarify market participants' financial obligations for force majeure events.

In June 2014, the ISO launched an effort to consider refinements to its market rules aimed at increasing price certainty and efficiency of prices cleared through its market. As a result, Management proposes the following three modifications to its market rules. First, a modification of the validation of self-schedules supported by transmission contract or ownership rights to avoid creating artificial congestion and to ensure efficient use of the ISO-controlled transmission grid. Second, a modification of the mathematical formulation for pricing constraint relaxation to eliminate the compounded pricing effect of penalty parameters for relaxation of contingency-related constraints. Third, a

modification of the mathematical formulation of market clearing logic to ensure that the market application produces a unique price in cases where constraints would otherwise create an array of possible prices. These three enhancements will strengthen market outcomes and provide more accurate and appropriate price signals.

Management proposes the following motion:

> ***Moved, that the ISO Board of Governors approves the pricing enhancements proposal as described in the memorandum dated December 10, 2014; and***
>
> ***Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.***

DISCUSSION AND ANALYSIS

Administrative pricing rules

On June 13, 2012, FERC granted the ISO's petition to waive tariff provisions related to setting administrative prices and settling real-time market transactions in response to the September 8, 2011 southwest power outage. FERC found that the administrative prices established by the ISO to set price signals in order to manage the emergency were not authorized by the tariff, but granted the ISO's waiver request. FERC also granted a tariff waiver to permit the ISO to hold tripped load and resources harmless by reversing out the day-ahead awards for both load and resources. FERC declined to decide whether the September 8 southwest power outage constituted a force majeure event or whether the ISO had tariff authority to hold resources harmless in the event of a force majeure event. FERC acknowledged the ISO's commitment to consider tariff changes to avoid confusion regarding pricing in the event of a similar emergency or market disruption in the future through a stakeholder process.

Management recognized that the existing administrative pricing tariff rule of using the last best price, while useful in filling brief gaps caused by intermittent market disruptions, may not provide appropriate price signals for more serious and lengthy market disruptions such as the 2011 southwest power outage, where the ISO had to suspend the market for several hours. Management also recognized the need to clarify the settlement implications in the event of a force majeure event. The following three part proposal for administrative pricing rules addresses these elements:

(1) Day-ahead administrative pricing

While such occurrences are very rare, it is possible that the day-ahead market outcome is either not available or is unreliable. For such cases, Management proposes that the ISO have the authority to use either day-ahead results – for both awards and prices – from the previous day, or rely fully on the results of the real-time market to operate and

price the energy transactions. The ISO will notify the market of its intended election by 6:00 PM the day before the operational day and will use it unless the ISO is ultimately able to clear the day-ahead market with a reliable solution in time to issue schedules and prices for the next day. This approach provides notice to the market of the ISO's anticipated use of the administrative pricing option while it continues to address the issues preventing a market clearing solution. Management believes that this approach will allow the ISO to pursue a day-ahead market solution that is superior to an administrative price option if one can be achieved.

The selection of the administrative option will be based on system conditions. If system conditions are not reasonably similar to the previous day, the ISO will rely on the real-time market. Although the ISO proposed to seek authority to use either the previous day's results or the real-time market, the ISO's preferred option will be to use the previous day's results if at all possible, for the following reasons. First, use of the previous day's day-ahead market results mitigates against the worst case scenario in which the real-time market might also be suspended. Second, using the previous day's solution provides the ISO with a starting point for dispatch and settlement, while the real-time market can provide the incremental or decremental differences between the day-ahead and real-time, thereby minimizing the need for manual instructions. Third, market participants will know in advance their awards and prices for the applicable trading date, minimizing uncertainty and allowing them to secure fuel and prepare their resources for commitment.

These rules are accompanied with corresponding settlements provisions. If the ISO decides to use the previous day's results of the day-ahead market, congestion revenue rights will be settled also with the prices of the previous day's results. Convergence bids will be suspended for the day when the day-ahead market is suspended. If the ISO determines it must rely on the real-time results, resources will be fully settled with real-time prices, and there will also be no convergence bids to settle. Based on feedback from stakeholders and the Market Surveillance Committee, Management proposes to settle congestion revenue rights with the hourly average of the fifteen-minute real-time market prices if there is the need to rely fully on the real-time market. This is necessary because, in such cases, resources will settle fully on real-time prices and will still be subject to congestion charges; this provision will provide the hedge for the real-time congestion.

(2) Real-time market administrative pricing

For the real-time market, the current requirement of using the last best price is well suited for minor market disruptions involving a limited number of missing fifteen-minute market or real-time dispatch intervals. This approach does not work as well for other circumstances in which, for example, the ISO experiences prolonged disruptions over multiple intervals. Therefore, Management proposes a three-tier approach that addresses the broader array of circumstances more effectively.

a) Tier 1- Brief non-emergency market disruptions

If the fifteen-minute market prices are missing for fewer than four consecutive intervals, or if the five-minute real-time dispatch interval prices are missing for fewer than twelve consecutive five-minute intervals, Management proposes to preserve the current administrative pricing of using the last best price for each market accordingly.

b) Tier 2 - Longer non-emergency market disruptions

If either the fifteen-minute market prices are missing for more than three consecutive intervals or the five-minute real-time dispatch interval prices are missing for more than eleven consecutive intervals under non-emergency system conditions, then the ISO will fill in missing prices as follows:

i. Where the real-time dispatch interval dispatch prices are not available but the fifteen-minute market prices are available, then the fifteen-minute market prices will be used to fill in missing real-time dispatch prices. Conversely, if the fifteen-minute market prices are missing but the five-minute real-time dispatch interval prices are available, then the simple average of the three applicable five-minute real-time dispatch interval prices will be used to fill for the missing fifteen-minute market intervals. This approach utilizes prices for the same corresponding hour, thus reflecting as closely as possible the same market conditions and would minimize the participants' exposure to imbalance charges between the fifteen-minute market and the five-minute market.

ii. Where both the fifteen-minute market and five-minute real-time dispatch interval prices are not available, the ISO would use prices from the day-ahead market cleared for the same trading hours. This provides greater price certainty and transparency and also minimizes imbalance charges across markets.

c) Tier 3 - Market suspension

The ISO already has tariff-based authority to suspend its market under specific conditions, and Management does not propose changes to that authority. Generally, suspension of the market, or elements of the market, occur under two scenarios: (1) the market could fail as a result of catastrophic software failure; or (2) the market results are of such poor quality that system operations cannot use them for reliable operation of the grid. The September 8, 2011 event involved such a large scale system emergency where generation and load tripped. Although the ISO's market software continued to function, the market results did not reflect the major system changes and did not align with actual conditions. For such instances in which the ISO suspends the real-time market, Management proposes to use prices from the day-ahead market cleared for the same trade hours. This approach provides the following benefits: First, it provides certainty to the marketplace as the prices are already known. Second, use of the day-ahead prices minimizes the settlements implications since any deviation of resources

between the day-ahead and the real-time markets will be settled at zero price difference. Third, using day-ahead prices also addresses the settlements for convergence bids since they will be liquidated at zero cost/profit. In case the day-ahead prices do not fully compensate resources, the bid cost recovery mechanism will use bids from the previous day-ahead market, while resources instructed manually will settle with the standard mechanism of exceptional dispatches. In the extreme case where both the day-ahead and real-time markets are not functioning and the ISO relies on using the previous day's results, the same applicable settlements provisions apply for the scenario of using the previous day's results for the real-time market suspension.

(3) Force majeure

Management proposes to preserve the current imbalance energy settlement rules that apply under force majeure events, but proposes to add language to the tariff that explicitly states that force majeure events do not alter the rules for settling deviations from day-ahead schedules and awards. As part of its tariff waiver filing in connection with the September 8, 2011 outage, the ISO argued that both tripped load and resources should be held harmless during the term of the massive outage and requested a tariff waiver to allow this result. FERC granted the ISO the relief through a tariff waiver, but its waiver was not based on a finding of whether the force majeure provision in section 14 of the tariff authorizes this result.

Management does not propose to extend force majeure to excuse imbalance energy charges as such. The ISO market design at its core relies on a two-step settlement between the financially binding day-ahead and real time markets. It imposes financial obligations on parties to pay or be paid based on the day-ahead award; if deviations from such awards take place in the real time, uninstructed deviations are settled accordingly. Such mechanism provides a framework for allocating price risk between the day-ahead and real-time markets. If a participant does not deliver its day-ahead award, it has the financial obligation to pay for the uninstructed deviation. When a market participant submits bids into the day-ahead market based on its location, economic strategy and risk premium, among other factors, participants are taking on the risk and consequences of participating in the market under such settlement terms. This rationale is important to consider for the efficient economical operation of a market.

Bid validation for bids supported with transmission rights

Currently, all market self-schedules submitted pursuant to the terms of existing transmission contract or ownership rights are exempt from any congestion charges accruing out of the congestion component of the locational marginal price. Scheduling coordinators must submit specific types of self-schedules in order to exercise this right. These special self-schedules are also afforded a higher scheduling priority than ordinary self-schedules that are not supported by transmission contract or ownership rights.

The self-schedules supported by transmission contract or ownership rights are validated during the bid submission process to ensure that only authorized holders of such rights receive the perfect hedge by validating that the special self-schedules are associated

with registered contract reference numbers. Under the current rules, if a scheduling coordinator submits a self-schedule supported by a transmission contract or ownership right that is not consistent with the contractual terms, the self-schedule is not always rejected entirely. Instead, in some cases the ISO accepts the self-schedule as an ordinary self-schedule and designates it with the same lower priority afforded to ordinary self-schedules. The ISO still provides the self-schedule the perfect hedge for the capacity scheduled within the terms of the agreement. This may result in artificial congestion in the system and may impact others participating in the market through either higher congestion charges for their energy or congestion revenue rights charges caused by the artificial congestion.

Management proposes to modify the bid validation rules so that if the validation detects an erroneous self-schedule, it is rejected entirely rather than allowing it to flow into the market as an ordinary self-schedule. Participants have the mechanism to identify bids in error during the bid submission process and will have the ability to resubmit a corrected self-schedule if it is submitted in time.

Enhanced formulation of contingency-related constraints

The ISO market system enforces transmission constraints that protect the system in case of a contingency of an outage of another transmission element. In some cases a transmission constraint may be affected by multiple contingencies that may occur. The market application uses a set of pricing parameters to indicate the cost associated with relaxing any of these constraints. There are instances when the market application produces a solution in which a transmission constraint cannot be resolved and must be relaxed due to multiple contingencies. Since each base and contingency case is treated as a separate constraint, each contingency case will have a congestion cost that will in turn be compounded in the marginal congestion component of the various locations impacted based on the shift factors. The cost of relaxing a constraint is based on a set of penalty prices, which are currently administratively pegged to the maximum bid caps. Therefore, in these cases where multiple constraints are relaxed, the market solution reflects a compounded price based on the totality of the penalty prices. This pricing is not the optimal way to price energy, because the compounding of penalty prices does not provide any further congestion relief than the congestion cost based on the pricing of the most relaxed contingency.

Management proposes to modify the current market application formulation so that the price will reflect the cost of congestion associated with the most limiting contingency under constraint relaxation conditions. With this proposal, all credible contingencies determined by operations studies will continue to be enforced in the market, as usual, but only the most limiting contingency will bind and be priced.

Modified market application formulation to attain unique prices

In an ideal market clearing process, prices are optimally set at the point where the downward sloping demand curve and upward sloping supply curves intersect. In cases where the curves intersect at a single point, this price is unique. This simplistic

characterization of supply and demand curves does not hold for markets with a step-wise bidding structure. Multi-step-wise bids can create the so-called “degenerate” pricing conditions that can result in multiple market-clearing prices under economic dispatch.

Although degenerate cases can lead to multiplicity of possible pricing solutions for the same dispatch, any of these solutions is optimal from a market clearing perspective. Degeneracy is rooted in the mathematical formulation and (pricing) optimization of a physical problem and is a well-known and understood condition. Linear programming commercial software products, like the one used in the ISO market application, often produce only one of the optimal solutions even though many others may also exist. This does not pose a problem for the physical market itself, but it does for when such prices are used outside of the physical energy market, as is the case for the day-ahead market whose prices are used for settlement of congestion revenue rights.

The ISO enforces multiple constraints in its market application to reflect the physical and scheduling, limitations of the system under various possible conditions. One type of constraint is the intertie constraint to limit import/export schedules between the ISO and neighboring balancing authority areas based on system conditions. Certain conditions, such as where an intertie is derated to zero limit in one direction but not in the other, can produce degenerate pricing solutions, and it is possible under such circumstances that a scheduling coordinator can set the price through a bid that creates artificial congestion even though no megawatts actually clear.

Management proposes an alternative solution formulation that will eliminate the condition leading to multiple prices and enable the market optimization to select the optimal price. That is, if the market clearing problem is limited by any constraint, the market clearing process would create a price for the constraint only when the relaxation of the constraint would result in a reduction in the total cost to operate the system. To do so, the existing linear programming model would be modified into a quadratic programming model using a new slack variable in both the objective cost function and in the constraint definition, which guarantees the uniqueness of prices associated with the various constraints in the system, including intertie constraints. The new formulation will ensure the price attained is consistent with existing least-cost dispatch principles already embodied in the ISO tariff. The new formulation will also ensure that for those cases in which the intertie is derated to a zero limit in only one direction, the resulting price does not create artificial congestion that creates complications for other products settled on the basis of the cost of congestion at the applicable locations.

POSITIONS OF THE PARTIES

There was general support for the proposals associated with: 1) the validation of self-schedules supported by transmission contract or ownership rights to avoid creating artificial congestion and to ensure efficient use of the ISO-controlled transmission grid, 2) the modification of the mathematical formulation for pricing constraint relaxation to eliminate the compounded pricing effect of penalty parameters for relaxation of

contingency-related constraints, and 3) the modification of the mathematical formulation of market clearing logic to ensure that the market application produces a unique price in cases where constraints would otherwise create an array of possible prices.

For the administrative pricing rules, there is one opposing view of the policy for settlements provisions for force majeure events, where a participant believes that intertie resources need to be financially excused of imbalance charges under force majeure events. Management believes that the current policy adheres to the market principle where participants bear the risk and cost of participating in a market. The market surveillance committee also expressed their opinion about having an alternate approach instead of using the day-ahead market prices for real-time market suspension. Management believes that using day-ahead prices provides a certain price signal and most importantly minimizes the settlement implications for resources dispatched under a market suspension.

The attached matrix of stakeholder comments discusses the positions of the parties related to each of Management's proposals.

MANAGEMENT RECOMMENDATION

Management recommends that the Board approve the various elements of the pricing policy enhancements proposed in this memorandum.

Attachment A

Stakeholder Process: Pricing Enhancements

Summary of Submitted Comments

Stakeholders submitted three rounds of written comments to the ISO on the following dates:

- Round One, 7/22/14
- Round Two, 10/10/14
- Round Three, 11/13/14

Stakeholder comments were received from: Brookfield Energy Marketing LP, California Department of Water Resources, Calpine Corporation, Morgan Stanley Capital Group, Pacific Gas & Electric Company, Powerex Corp., Six Cities, San Diego Gas and Electric, Shell Energy North America, Southern California Edison, Western Area Power Authority and Western Power Trading Forum.

Stakeholder comments are posted at: http://www.caiso.com/informed/Pages/StakeholderProcesses/PricingEnhancements.aspx

Other stakeholder efforts include:

- Stakeholder call, 7/10/14
- Stakeholder call, 10/03/14
- Stakeholder call, 11/06/14

Stakeholder	Management proposal: Administrative Pricing Rules. Use two tiers for setting administrative pricing in the real time market for non-market suspension conditions	Management response
Pacific Gas & Electric Company	Final proposal strikes an acceptable balance between price certainty and assurance of cost recovery, and flexibility for the ISO to manage the grid under adverse conditions.	During this stakeholder process, staff and stakeholders discussed and explored the advantages and disadvantages of the various alternatives to determine the administrative pricing rules. The conclusion was to pursue the tiered approach. The proposal strikes a balance between preserving price signals, providing price certainty, and practicality. The tiered approach accounts for the length of the disruption. The ISO provided further clarifications and numerical examples through the process as needed. The option of calculating an administrative price based on last available information may not work in instances where the software fails to find a solution; also, if the failure is for a long enough period of time, recreating the conditions for each market interval that failed would require multiple assumptions of conditions. The last available information may also not be representative of what the market solution and system conditions, like outages, should have been if a long period of time has passed.
Six Cities	Supports	
San Diego Gas and Electric	Supports - would like to see monitoring of methods employed to ensure best practices are implemented.	
Southern California Edison	No position - requested scenarios for the proposed tiers.	
Powerex Corp	No comments	
Morgan Stanley Capital Group	Prefers to use current logic of last available price instead of day-ahead prices.	
Western Power Trading Forum	Appreciates the firm rules specified by the ISO with respect to which prices to use during brief periods when the ISO's systems fail to produce prices.	
Brookfield Energy Marketing LP	Support a tier approach to account for length of the disruption. Suggests to calculate price on last available information; if not possible, then resorting to day-ahead prices.	
Calpine Corporation	Prefers re-calculation of prices using the best information available in absence of prices for longer than one hour.	
California Department of Water Resources	The last price is appropriate for a short period of missing prices. For longer periods suggests to have an adjustment factor based on conditions.	
Shell Energy North America	Certainty is very helpful to market participants; it may be an improvement to have a tariff based administrative price rather than the last valid price set in the market prior to intervention.	
Western Area Power Authority	No position	

Stakeholder	Management proposal: Administrative Pricing Rules. Use the day-ahead market prices for a real-time market suspension	Management response
Pacific Gas & Electric Company	Final proposal strikes an acceptable balance between price certainty and assurance of cost recovery, and flexibility for the ISO to manage the grid under adverse conditions.	Management proposes to use prices from the day-ahead market cleared for the same trade hours. This option provides various benefits. First, it is a knowable and defined price that provides certainty to the market place. Second and most importantly, use of the day-ahead prices minimizes the settlements implications since any deviation of resources between the day-ahead and the real-time markets will be neutralized, including the settlements for convergence bids. This with the use of the standard bid cost recovery mechanism to compensate for uncovered cost will provide the certainty for settling resources affected during a market suspension. The option of calculating an administrative price manually and then accounting for a premium was originally explored. Based on the nature of the event, a higher price will not always be the right price and resources may be required under some scenarios to decrease generation or shutdown. These factors will result in unintended imbalance charges that would require another mechanism to correct. Similar problems may result in using a set price.
Six Cities	Supports	
San Diego Gas and Electric	Supports - would like to see monitoring of methods employed to ensure best practices are implemented	
Southern California Edison	Requested to provide scenarios for the proposed tiers.	
Powerex Corp	No position	
Morgan Stanley Capital Group	Prefers to calculate an administrative price manually and then adding a risk and uncertainty price	
Western Power Trading Forum	Prefers to calculate an administrative price based on prevailing conditions, but if not then request to describe how resources will be compensated	
Brookfield Energy Marketing LP	Supports a tier approach to account for length of the disruption. Suggests to calculate price on last available information; if not possible, then resorting to day-ahead prices.	
Calpine Corporation	Supports administrative pricing rules with known or knowable prices as opposed to the last “good” price for “major collapses”.	
California Department of Water Resources	The last price is appropriate for a short period of missing prices. For longer periods suggests to have an adjustment factor based on conditions.	
Shell Energy North America	Suggests establishing a set price	
Western Area Power Authority	No position	

Stakeholder	Management proposal: Administrative Pricing Rules. For a day-ahead market suspension use either the previous day of the day-ahead market or rely fully on the real-time market results.	Management response
Pacific Gas & Electric Company	Final proposal strikes an acceptable balance between price certainty and assurance of cost recovery, and flexibility for the ISO to manage the grid under adverse conditions.	Management proposes to use either day-ahead results for both awards and prices from the previous day, or rely fully on the results of the real-time market to operate and price the energy transactions. The ISO will make its decision to use one of these two options by 6:00 PM based on the evaluation of the actual and expected system conditions. If system conditions are not reasonably similar to the previous day, the ISO will rely on the real-time market. Management believes that having the option to choose either the previous day-ahead solution or the real-time market results does not deteriorate the certainty aimed for this process because the decision and option will be made by the time the ISO has to declare a day-ahead market suspension, in advance of the trading date. This decision will be made once all the conditions are known for this event. In the final proposal, it was clarified that the bids from the day-ahead market will also be used for the bid recovery settlement.
Six Cities	Opposes to use either/or approach; prefers the option of always using previous day of the day-ahead market.	
San Diego Gas and Electric	Supports - would like to see monitoring of methods employed to ensure best practices are implemented.	
Southern California Edison	Requested clarification of what bids would be used for bid cost recovery.	
Powerex Corp	No position	
Morgan Stanley Capital Group	No position	
Western Power Trading Forum	No position	
Brookfield Energy Marketing LP	No position	
Calpine Corporation	No position	
California Department of Water Resources	No position	
Shell Energy North America	No position	
Western Area Power Authority	No position	

Stakeholder	Management proposal: Preserve the current policy for settlements provisions related to events outside the control of market participants.	Management response
Pacific Gas & Electric Company	Supports	The settlements implications for force majeure events was considered in this stakeholder process as part of the revision for the administrative pricing rules in light of the discussion associated with the September 2011 outage. Management considered it necessary to take this opportunity to explore and clarify the settlements implications. Management proposal is to preserve the current imbalance energy settlement rules that apply under Force Majeure events but proposes to add statements in the ISO tariff that explicitly mention that force majeure does not alter the rules for settling deviations from day-ahead schedules and awards. By market principle, this existing provision provides a framework for allocating price risk between the day-ahead and real-time markets. If a participant does not deliver its day-ahead award, it has the financial obligation to pay for the uninstructed deviation. When a market participant submits bids into the day-ahead market based on its location, economic strategy and risk premium, among other factors, participants are taking on the risk and consequences of participating in the market under such settlement terms. This rationale is important to consider for the efficient economical operation of a market.
Six Cities	No comments	
San Diego Gas and Electric	No comments	
Southern California Edison	Force Majeure as defined in the ISO tariff is not for this discussion	
Powerex Corp	Opposes - proposes that intertie resources should have settlements provisions for conditions beyond the intertie resources	
Morgan Stanley Capital Group	No comments	
Western Power Trading Forum	Has no particular objection to holding all parties to day-ahead positions.	
Brookfield Energy Marketing LP	Supports to further clarify the implications as part of this stakeholder process	
Calpine Corporation	Believes that risks of delivering energy to load centers should not be eliminated by ISO market rules, and that benefits of locational marginal pricing will only be captured if ISO market rules preserve locational delivery risk	
California Department of Water Resources	Believes that there is a need for more clarity regarding the settlements associated with force majeure	
Shell Energy North America	Supports an approach in which market participants are settled out at their day-ahead schedules at day-ahead prices.	
Western Area Power Authority	No comments	

Stakeholder	Management proposal: Modify bid validation rules for bids associated with contract transmission rights	Management response
Pacific Gas & Electric Company	Supports	Clarifications were added to the revised proposal
Six Cities	Supports	
San Diego Gas and Electric	Supports	
Southern California Edison	Supports	
Powerex Corp	No comments	
Morgan Stanley Capital Group	No comments	
Western Power Trading Forum	Supports	
Brookfield Energy Marketing LP	Supports	
Calpine Corporation	No comments	
California Department of Water Resources	Supports	
Shell Energy North America	No comments	
Western Area Power Authority	No position - asked for clarifications to the description in the straw proposal round	

Stakeholder	Management proposal: Enhance the modelling of contingencies to handle compounding pricing of relaxed contingencies	Management response
Pacific Gas & Electric Company	Supports	Data related to the frequency of historical instances was provided in the revised proposal.
Six Cities	Supports	
San Diego Gas and Electric	Supports	
Southern California Edison	Supports	
Powerex Corp	No comments	
Morgan Stanley Capital Group	No comments	
Western Power Trading Forum	Is open to the ISO's exploration of modifying the pricing effects when multiple contingencies affect a single constraint.	
Brookfield Energy Marketing LP	The proposal seems to be the best solution as it will only be utilized in the event that there are insufficient economic bids to settle the contingencies. Requires to provide data of historical instances.	
Calpine Corporation	No comments	
California Department of Water Resources	Requested more information about historical instances, details of the proposal and examples	
Shell Energy North America	No comments	
Western Area Power Authority	No comments	

Stakeholder	Management proposal: Enhance the market modelling of constraints to ensure uniqueness of prices related constraints	Management response
Pacific Gas & Electric Company	Supports	The revised proposal included more details of the proposal as well as examples.
Six Cities	No position	
San Diego Gas and Electric	Supports	
Southern California Edison	Does not oppose	
Powerex Corp	No position	
Morgan Stanley Capital Group	No position	
Western Power Trading Forum	Strongly supports - encourages the ISO to publish further information about its proposed methods.	
Brookfield Energy Marketing LP	Supports the ISO's further evaluation of solutions to address multiplicity of prices. Requires examples to better understand.	
Calpine Corporation	No position	
California Department of Water Resources	Supports	
Shell Energy North America	No position	
Western Area Power Authority	No position - asked for more details and examples.	

Attachment F – List of Key Dates in the Stakeholder Process

Tariff Amendment to Implement Administrative Pricing Policy and Tariff Clarifications
California Independent System Operator Corporation

November 23, 2016

List of Key Dates in the Stakeholder Process for this Tariff Amendment

Date	Event/Due Date
July 1, 2014	CAISO issues paper entitled "Pricing Enhancements – Issue Paper and Straw Proposal"
July 10, 2014	CAISO hosts stakeholder conference call that includes discussion of paper issued on July 1 and presentation entitled "Pricing Enhancements – Issue Paper and Straw Proposal"
July 22, 2014	Due date for written stakeholder comments on paper issued on July 1
September 26, 2014	CAISO issues paper entitled "Pricing Enhancements – Revised Straw Proposal"
October 3, 2014	CAISO hosts stakeholder conference call that includes discussion of paper issued on September 26, stakeholder comment matrix, and presentation entitled "Pricing Enhancements – Revised Straw Proposal"
October 10, 2014	Due date for written stakeholder comments on paper issued on September 26
October 30, 2014	CAISO issues paper entitled "Pricing Enhancements – Final Proposal"
November 6, 2014	CAISO hosts stakeholder conference call that includes discussion of paper issued on October 30, stakeholder comment matrix, and presentation entitled "Pricing Enhancements – Final Proposal"
November 13, 2014	Due date for written stakeholder comments on paper issued on October 30
June 3, 2015	CAISO issues draft tariff revisions to implement administrative pricing enhancements, and table comparing relocated and proposed tariff provisions in this initiative with existing tariff provisions
June 15, 2015	Due date for written stakeholder comments on materials issued on June 3
June 19, 2015	CAISO hosts stakeholder conference call that includes discussion of materials issued on June 3
June 30, 2015	Due date for further written stakeholder comments on materials issued on June 3
July 7, 2015	CAISO hosts further stakeholder conference call that includes discussion of materials issued on June 3
September 15, 2015	CAISO issues updated version of draft tariff revisions to implement administrative pricing enhancements
September 25, 2015	Due date for written comments on draft tariff revisions issued on September 25
October 2, 2015	CAISO hosts stakeholder conference call that includes discussion of draft tariff revisions issued on September 25

Date	Event/Due Date
October 25, 2016	CAISO issues further updated version of draft tariff revisions to implement administrative pricing enhancements
November 1, 2016	Due date for written comments on draft tariff revisions issued on October 25
November 8, 2016	CAISO hosts stakeholder conference call that includes discussion of draft tariff revisions issued on October 25