

May 2, 2005

Via Electronic Filing

The Honorable Magalie R. Salas
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

**Re: Establishing Reference Prices for Mitigation in Markets
Operated by Regional Transmission Organizations and
Independent System Operators,
Docket No. PL05-6-000**

Dear Secretary Salas:

Enclosed please find the Comments of the California Independent System Operator Corporation, submitted in the captioned docket.

Feel free to contact the undersigned with any questions. Thank you for your attention to this matter.

Respectfully submitted,

/s/ Bradley R. Miliauskas
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Independent System Operator
Corporation

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

**Establishing Reference Prices for) Docket No. PL05-6-000
Mitigation in Markets Operated by)
Regional Transmission Organizations)
and Independent System Operators)**

**COMMENTS OF THE
CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**

Pursuant to the Commission's "Notice Inviting Comments on the Establishment and Use of Reference Prices" issued in the captioned docket on April 1, 2005 ("Notice Inviting Comments"), the California Independent System Operator Corporation ("CAISO")¹ hereby provides comments in the captioned proceeding. In support thereof, the CAISO states as follows:

I. COMMUNICATIONS

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¹ Capitalized terms not otherwise defined herein are used in the sense given in the Master Definitions Supplement, Appendix A to the CAISO Tariff, as filed August 15, 1997, and subsequent revised.

II. BACKGROUND

In the Notice Inviting Comments, the Commission “invite[d] all interested persons to file comments addressing the roles of Regional Transmission Organizations (RTOs), Independent System Operators (ISOs), or their market monitors (or contractors) in establishing reference prices to mitigate bids in order to limit non-competitive results in wholesale electric markets.” Attachment A to the Notice Inviting Comments (“Attachment A”) explained that “[a] number of RTOs and ISOs use ‘conduct and impact’ tests in their wholesale day-ahead and *real-time markets to determine if mitigation should be applied in order to assure just and reasonable rates,*” and noted that the CAISO is one of RTOs/ISOs that uses such tests.² Attachment A also noted (at footnote 4) that the CAISO “uses an independent consulting firm, rather than the [CA]ISO itself or an internal or external market monitor, to determine reference levels.”

The Commission stated that the comments it sought from interested persons could “focus on particular geographic region(s) of the United States or upon energy markets in general.” The Commission expressed a particular interest in comments that addressed the specific questions listed in the Notice Inviting Comments.

² Attachment A explained that “[t]he ‘conduct and impact’ approach to mitigation of economic withholding looks at the bids (also called offers) that units make into the RTO and ISO energy markets, to determine if economic withholding has occurred and thus if mitigation of one or more bids would be appropriate in order to assure just and reasonable rates.”

III. COMMENTS

A. Summary of Main Points Based on the CAISO's Experience

The CAISO appreciates the opportunity to offer comments in this proceeding. The CAISO has had several years of experience with the use of reference prices, and bid conduct and market impact tests, and thus is able to provide its own perspective on these market power mitigation tools. Before addressing the specific questions posed by the Commission in the Notice Inviting Comments, the CAISO would like to offer the following overarching comments and observations:

1. The CAISO believes that the use of a price screen for triggering the CAISO's Automated Mitigation Procedures ("AMP," sometimes also referred to as "system AMP") has proven to be problematic due to the "real-time" nature of the market, which requires the performance of bid conduct and market impact tests based on forecasts of the market. In addition, the CAISO does not see any justifiable need for a price screen because the bid conduct and market impact tests are sufficient screens in and of themselves. A better solution would be for the CAISO to run AMP every hour and not use a price screen. The CAISO's current price screen of \$91.87/MWh is a relic dating back to the 2000-2001 California energy crisis and is, in the view of the CAISO, not necessary.
2. The default order for setting reference prices should be that cost-based reference prices are used first and bid-based reference prices should be used second (in cases where cost-based pricing may not be

straightforward, such as is the case with hydro-electric and use-limited resources). Bid-based reference prices should be used as only a secondary measure for several reasons. The purpose of a bid-based procedure for mitigating market power is to identify bids that reflect market power and to replace them with alternative bids that reflect each generating unit's variable cost, as this is the best estimate of the bidding behavior that can be expected in a competitive market. That procedure is by its very nature cost-based and is essentially a cost-based backstop to a failed market. Conversely, the current reliance on bid-based reference prices may result in reference prices that reflect non-competitive behavior. The current method for determining bid-based reference prices, which is based on a 90-day rolling average of accepted offers, gives participants an incentive to influence their reference price by changing their everyday bidding behavior.³ In addition, the less competitive the market becomes and the more predictable that lack of competition will be, the greater the incentive and ability of the generator to self-manage its reference price. In other words, a bid-based reference price approach will tend to become less effective at mitigating market power as the duration and intensity of market power increase. This is an undesirable characteristic for a market power mitigation tool. Cost-based reference levels do not suffer from this

³ In fact, based on the CAISO's comparison of bidding behavior before and after the implementation of AMP at the CAISO, it appears that, under a system of bid-based reference pricing, off-peak bid prices have a tendency to increase, thus potentially resulting in higher average costs to the consumers. The CAISO's analysis of such bidding behavior is discussed in greater detail in Appendix 1 to these comments.

undesirable characteristic, and should therefore be the primary method for setting reference prices.

3. The CAISO believes that the thresholds for conduct and impact tests are often too great to provide effective market power mitigation, especially given the fact that bid-based reference prices may already reflect some level of market power due to strategic bidding.
4. When bid-based reference prices are used, the bids used to determine these reference prices should be rigorously screened for competitive conditions. In the CAISO's experience it is possible, under more than one set of circumstances, for participants to unduly influence their reference prices such that the reference prices reflect the very market power that those prices and the conduct and impact tests were designed to mitigate. *Cost-based reference prices do not suffer from that problem.*
5. Reference prices should be calculated by an independent entity. Currently, Potomac Economics ("Potomac") is the independent entity that calculates reference prices for the CAISO, but the CAISO believes that there is no reason why it should not be permitted to do so itself. The CAISO was established as an Independent System Operator to provide open and non-discriminatory access to wholesale energy markets and transmission service. The CAISO believes it is an independent entity and is therefore fully capable of administering reference prices in a fair and objective manner. Furthermore, because the CAISO is responsible for coordinating market operations and has direct links with the CAISO

Governing Board and the Commission, the CAISO is in a unique position that best suits it to analyze issues regarding reference prices.

A more detailed discussion of some of the above observations and comments is provided in Appendix 1 to the present filing. In addition, Appendix 2 to this filing contains draft comments of the Chairman of the Market Surveillance Committee (“MSC”) of the CAISO (prepared in consultation with the other members of the MSC) in response to the Notice Inviting Comments.

B. CAISO Responses to the Commission’s Questions

With regard to the questions listed in the Notice Inviting Comments (which are listed below in italics), the CAISO provides the following responses:

1.a. In practice, when are reference prices used?

Under the CAISO Tariff, reference prices are used in the following three circumstances:

- Incremental reference prices are used in the CAISO’s system-wide price mitigation software when generating units are incremented in-sequence.
- Incremental reference prices are used in the CAISO’s local market power mitigation (“LMPM”) procedures when generating units are incremented out-of-sequence (“OOS”) due to Intra-Zonal Congestion.
- Decremental reference prices are used whenever in-state resources are decremented OOS due to Intra-Zonal Congestion.

1.b. In practice, by whom are reference prices developed?

The incremental and decremental reference price methodologies and formulae used in the CAISO were developed by the CAISO and were approved by the Commission. The actual reference prices and adjustments are calculated by an independent entity, Potomac.

1.c. In practice, what can be reference prices' effect, if any, on the wholesale market-clearing price and wholesale rates for electric energy?

Due to market conditions and the characteristics of the AMP, no bids have been mitigated by system AMP since implementation, so there has been no obvious effect on the Market Clearing Price ("MCP"). Nevertheless, the presence of reference prices and an AMP system may have affected the bidding behavior of Market Participants. One of the features of a bid-based reference price, when combined with an AMP procedure, is that it will inhibit the escalation of market prices during sustained periods of market power. The degree to which the AMP system dampens prices during such periods depends on the conduct and impact thresholds that trigger bid mitigation. The CAISO's reference prices have not affected market prices overtly and appear unlikely to have changed bidding behavior much, because the AMP conduct and impact thresholds are so high and market conditions since AMP was implemented have been generally workably competitive.

1.d. In practice, how often do reference prices affect market-clearing prices?

In the CAISO system, reference prices have yet to affect MCPs overtly.

2. *In what ways do reference prices in the wholesale market function like bid caps, and in what ways are they like formula rates?*

Reference prices have similarities to, but are distinguishable from, both bid caps and formula rates. The similarities to bid caps and formula rates depend to a large extent on the way the reference prices are established for resources (*i.e.*, based on whether the reference prices are cost-based, market-based, or negotiated) and the way the reference prices are applied (*e.g.*, for purposes of system-wide impact study or local market power mitigation as used in PJM and proposed under the CAISO's Market Redesign & Technology Upgrade ("MRTU")).

A cost-based reference price generally includes provisions for adjustments according to fuel prices, and in that sense it has some of the characteristics of a formula rate. Such provisions are generally absent from reference prices established based on successful market bids, and may or may not be included in negotiated reference prices. All types of reference prices are generally different from formula rates in that when a resource is dispatched it can collect the higher of the reference price or the MCP at the resource location.

Regardless of how the reference prices are established, they may be thought of as conditional bid caps depending on the application. In AMP applications – whether for system-wide or local market power mitigation – the reference prices are not binding (*i.e.*, they do not act like bid caps) unless both the conduct and impact tests are violated. In LMPM applications using "out-of-

merit-order dispatch” as a trigger for bid mitigation, the reference prices act like a bid cap for out-of-merit-order dispatch.

3. *Under what circumstances do RTOs, ISOs, their market monitors, or their consultants use discretion in setting reference prices?*

Currently the CAISO’s role is limited to the more standardized and non-discretionary aspects of the calculation of reference prices, such as developing methodologies and formulae. The day-to-day calculation of reference prices is performed by Potomac. Potomac has some discretion with regard to the determination of consultative reference prices (as described below).

What is the nature of the discretion used?

See above.

Is their discretion within the parameters prescribed in the RTO or ISO’s Commission-approved, filed tariff?

Yes. The CAISO Tariff describes the circumstances in which Potomac has discretion in determining reference prices.

CAISO Tariff Section 7.2.6.1.1(a) prescribes a set of five steps to be applied to determine decremental reference levels – the first step is followed as needed, and if the first step does not apply, then the second listed step is followed as needed, etc.⁴ The second step is that decremental reference levels are “determined in consultation with the Market Participant submitting the bid or

⁴ Similarly, Section 3.1.1.1(a)(1) of Appendix A of the Market Monitoring and Information Protocol (“MMIP”) contains a five-step process for determining AMP reference levels.

bids at issue” CAISO Tariff Section 7.2.6.1.1(a)(2).⁵ Such consultative reference levels would be impossible if Potomac had no discretion.

The fifth step provides in relevant part that, if none of the other four steps applies, Potomac will determine a reference level on the basis of:

- i. [Potomac’s] estimated costs of an electric facility, taking into account available operating costs data, opportunity cost, and appropriate input from the Market Participant, and the best information available to [Potomac]; or
- ii. an appropriate average of competitive bids of one or more similar electric Facilities.

CAISO Tariff Section 7.2.6.1.1(a)(5).⁶ It would be impossible for Potomac to follow this step if it did not have any discretion (e.g., Potomac would have no basis for determining what “the best information available” was, or for determining what were “similar electric Facilities”).

Potomac, rather than the CAISO, exercises the discretion described above in compliance with direction provided by the Commission. In a July 17, 2002 Order in the MRTU proceeding, the Commission stated:

We also believe the calculation process for determining the reference price (the price at which a bid will be mitigated if AMP is applied) affords too much discretion to the CAISO. We share interveners’ concerns regarding the calculation of reference prices,

⁵ The third step stated in Section 3.1.1.1(a)(1) of Appendix A of the MMIP contains a similar provision.

⁶ The fifth step stated in Section 3.1.1.1(a)(1) of Appendix A of the MMIP contains a similar provision.

and believe that those concerns are best addressed by requiring an independent entity to calculate reference prices.⁷

Moreover, the Commission has stated its “confidence in the ability of the independent entity to produce an unbiased work product.”⁸

Is discretion necessary in determining reference prices and if so, under what circumstances?

Discretion is necessary in some circumstances. For example, determining a reference price for hydro-electric facilities based on a formula can be very difficult due to the fact that such facilities’ variable costs of providing power can change dramatically from one season to the next.

Can reference prices be developed without discretion on the part of the RTO, ISO or market monitor?

It is conceivable that reference prices could be developed without discretion, but the calculation formulae would have to be more precise and such a method likely would be perceived to be less fair than a partly discretionary system. Ultimately, if the reference prices under a non-discretionary system were perceived by a Market Participant to be unfair, the Market Participant could be expected to seek redress from the Commission and the Commission would address the issue through a proceeding. Having a partly discretionary system appears to be more efficient from a regulatory standpoint than having a

⁷ *California Independent System Operator Corporation*, 100 FERC ¶ 61,060, at P 70. See also *California Independent System Operator Corporation*, 103 FERC ¶ 61,265, at P 41 (2003) (directing the CAISO to “use reference prices for dec bids to be administered by an independent entity”).

⁸ *California Independent System Operator Corporation*, 101 FERC ¶ 61,061, at P 38 (2002).

completely non-discretionary system, because under a partly discretionary system, smaller issues related to the circumstances of specific resources can be resolved through use of discretion and larger issues can be resolved through a proceeding before the Commission, if necessary. In addition, it is unclear if it would be efficient use of the Commission's resources to be involved in the minutiae of determining reference prices for each generator.

3.a. If RTOs, ISOs, their market monitors, or their consultants exercise discretion within the parameters prescribed in the RTO or ISO's Commission-approved, filed tariff, is such discretion an impermissible delegation of the Commission's authority or is it a permissible implementation of a Commission-approved tariff?

Potomac's exercise of discretion is a permissible implementation of the Commission-approved CAISO Tariff.

With respect to possible impermissible delegations of authority, does it make a difference if it is the RTO, ISO or an internal market monitor that exercises discretion within the parameters of a Commission-approved, filed tariff, or if it is an external market monitor or other consultant that exercises such discretion?

The Commission has found that the independent entity (Potomac), rather than the CAISO, should exercise discretion in determining reference prices.

3.b. How often do RTOs, ISOs and their market monitors consult with individual market participants to determine the appropriate reference prices(s) for that market participant's unit(s)?

The CAISO does not have experience in this area because, pursuant to the Commission's directives, Potomac is responsible for consultations with Market Participants to determine the appropriate level of reference prices.

How is the consultation process carried out?

See above.

Is this consultation process appropriate?

See above.

3.c. *How do RTOs, ISOs and their market monitors resolve disagreements with market participants about methods used to determine their individual reference prices, or about the data used to calculate their reference prices?*

See above.

4. *Is there a reason why reference prices, once set, would need to be adjusted quickly?*

As the reference prices are based on 90-day rolling averages and the formulae and methodologies are approved by the Commission, there seems to be little reason for quick adjustments. One exception may be for hydro-electric facilities, which could have very abrupt changes in variable costs in transitioning from a water storage season to a water run-off season. Adjustments due to changing fuel costs are generally already included in the reference-price formula.

5. *How often are reference prices set based on the market monitor or RTO/ISO's estimate of a unit's generating costs, compared to other methods of calculating reference prices?*

Reference prices in the CAISO's market are determined by Potomac.

6. *To the extent that the RTO, ISO or market monitor may affect the market-clearing price at one or more locations and time intervals by determining reference prices, is there a better system that can be employed to mitigate bids?*

It is unclear to the CAISO whether the Commission's question concerns the impact on MCPs caused by the *determination* of reference prices or the *application* of reference prices.

If the Commission's question concerns the impact of the determination of reference prices on MCPs, then only market-based reference prices are of concern in answering the question. This is because, as noted previously, under market-based methods of establishing reference prices, bidders may have an *incentive to bid strategically (i.e., to bid above cost-based levels but just below expected MCPs, in order to maintain a high level of reference price)*. Because no bidder can perfectly predict the MCP or the bidding behavior of others, such strategic bidding will likely impact the MCPs, particularly during off-peak hours, even under competitive market conditions. Cost-based reference prices (e.g., cost plus 10%) are *far superior to market-based reference prices in preventing such bidding behavior and potential price distortion*.

If, on the other hand, the Commission's question concerns the impact of the application of the reference prices on MCPs, the CAISO would note that the very intent of bid mitigation is to affect the MCP so that it is more reflective of a competitive outcome. *In addition, a bid reflecting market power, if unmitigated,*

can impact not only the price the specific resource collects in a specific interval, but also the prices at other locations and other intervals (due to inter-temporal constraints). Therefore, bid mitigation should not be designed to only reset prices at a specific location or time interval.

6.a. Should some method other than reference prices within a conduct and impact approach to mitigation be used? If so, what method? Would this alternative method involve discretion on the part of the market monitor, ISO or RTO?

As stated above, the combination of market-based reference prices and conduct and impact tests may have unintended consequences. These consequences are somewhat reduced by using cost-based reference prices. However, even cost-based reference prices and conduct and impact tests with generous thresholds will not completely deter the exercise of market power. A generous impact threshold still permits the exercise of local market power that occurs below the impact threshold.

The CAISO believes that mitigation against local market power is far more important than system-wide mitigation due to the much greater potential for the former, and that mitigation based on out-of-merit-order dispatch is superior to mitigation based on conduct and impact thresholds. In cases where resources are frequently mitigated and cannot collect market revenues to cover their fixed costs, they should receive side payments through bilateral contractual arrangements. Such bilateral contractual arrangements should, in the first instance, be between the load serving entity and the supplier with the CAISO

offering a backstop contractual option such as Reliability Must-Run (“RMR”). The amounts of side payments to be made under these bilateral contractual arrangements can be informed by the experience gained in proceedings concerning rates under the CAISO’s RMR Contracts (involving the Commission, state entities, Participating Transmission Owners/Utility Distribution Companies, and the CAISO) to ensure that RMR resources recovered their fixed costs.

6.b. Reference prices could be developed by the market monitor, but submitted to the Commission for its approval. Should reference prices be set in that manner?

Cost-based and market-based reference prices are set based on rules and hard data. Once these rules are agreed upon and approved by the Commission, there is little value in the Commission’s further involvement in the evaluation of the data that is needed to determine reference prices. Therefore, the CAISO assumes that the Commission’s question concerns negotiated reference prices. Such prices could be determined by mutual agreement between the supplier and the market monitor; in cases where the supplier and market monitor could not agree on the prices, the matter could be referred to the Commission. Alternatively, the matter could be referred to an independent entity designated by the Commission for adjudication. If the Commission is not going to calculate the reference prices itself then the CAISO, as an independent entity, is in the best position to perform this function.

IV. CONCLUSION

Wherefore, for the foregoing reasons, the CAISO respectfully requests that the Commission give consideration to the foregoing comments.

Respectfully submitted,

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Date: May 2, 2005

APPENDIX 1

APPENDIX 1: THE CAISO EXPERIENCE WITH SYSTEM AMP

Background

The CAISO implemented its Automated Mitigation Procedure (“AMP”) on October 30, 2002 as part of Phase 1A of the Market Design 2002 (“MD02”) process directed by the Commission in its Order of July 17, 2002.⁹ System AMP is a procedure designed to prevent the exercise of market power and is applied to all bids submitted to the CAISO’s Real Time Market.¹⁰ The principal design elements of system AMP are summarized in Table A below.

⁹ *California Independent System Operator Corporation*, 100 FERC ¶ 61,060 (2002) (“July 17, 2002 Order”). MD02 is now known as the Market Redesign & Technology Upgrade (“MRTU”).

¹⁰ At present the CAISO does not facilitate a forward energy market. Therefore, the Real Time Market is the only market in which AMP is relevant. The CAISO’s redesigned market under the MRTU project will include a forward spot (day-ahead) energy market.

Table A: Design Elements of the CAISO System AMP

Design Element	Commission Ruling
Minimum Price Screen	\$91.87/MWh for all zones
Conduct Threshold	The lower of 200% or \$100 increase over reference price
Impact Threshold	The lower of 200% or \$50 increase in Market Clearing Price ("MCP")
Applicability	<p>Pursuant to the July 17, 2002 Order:</p> <ol style="list-style-type: none"> 1) Hydro and imports included 2) Small portfolios exempt from AMP once full network model is in effect 3) No exemption for new generation 4) Price offers below \$25/MWh exempt 5) Applicable in all hours even if forecasted load exceeds 40,000 MW <p>Pursuant to the Commission's October 11, 2002 Order on Rehearing:¹¹</p> <ol style="list-style-type: none"> 6) Reversed the July 17, 2002 Order to include imports. Exempted bids from outside California from AMP and required imports to submit zero bids into CAISO markets. The zero bid requirement was later amended and continues to be subject to modification

Cost-Based Reference Levels

The CAISO sees the purpose of system AMP as being to identify bids that reflect market power, and replace them with an alternative that reflects each generating unit's variable cost. This procedure is by its very nature cost-based

¹¹ *California Independent System Operator Corporation*, 101 FERC ¶ 61,061 (2002).

and is essentially a cost-based backstop to a failed market. The current default methodology to calculate reference prices is specified in Section 7.2.6.1.1 of the CAISO Tariff for decremental reference prices and Section 3.1.1.1 of Appendix A of the CAISO's Market Monitoring & Information Protocol ("MMIP") for incremental reference prices. In both cases the default methodology is bid-based. The CAISO believes that the default methodology should be cost-based where practicable. There are a number of good reasons for this. Prominent among these is the phenomenon of reference price "creep" that the CAISO has observed under bid-based reference pricing.

Reference Price "Creep" ("RPC")

One of the features of the current bid-based mitigation system is the effect that the mitigation system has on bidding behavior. In the period between January and September 2004, generating units sometimes were able to bid and effectively set high incremental prices, usually during a contingency. Except on rare occasions, these generating units were bidding in a manner that would not have failed the conduct test for determining if mitigation should be applied. That is, the generating units were bidding within their individual reference level thresholds, no higher than the lesser of \$100/MWh above or three times their reference levels.

Between October and December 2004, a small number of generating units repeatedly acted as price-setters without failing the conduct test. Certain steam generators within Zone SP15 in particular were able to increase reference levels while bidding under conduct test thresholds and then set prices in the range of

\$155-175/MWh almost daily. This was about \$80/MWh above estimated incremental production cost during this period. By late December 2004, these production costs resulted in conduct test failure thresholds in excess of the \$250/MWh soft price cap. At that point, the price cap became binding, so a bid that would have failed the conduct test would not have been eligible to set the price anyway.

The generating units caused these things to happen by bidding high prices during constrained conditions. The CAISO system is currently constrained during morning and evening ramping periods, and this is when these generating units are dispatched.¹² Because supply is limited during these constrained conditions, there is insufficient competition to discipline the bidding behavior of these units. When the mitigation system is linked to bidding behavior, as it is with bid-based reference prices, generators can adjust the price of their bids so as to influence their reference prices. If the market is competitive in every hour of every day, such adjustments will not have an impact on the effectiveness of the mitigation system, as competition will constrain bidding behavior. Unfortunately, there are periods when the market is less competitive – periods such as morning and evening ramps and high load days – and it is during these periods that AMP is most likely to be necessary. Due to its reliance on bids rather than costs to set reference prices, AMP is rendered less effective than it might otherwise be. A bid-based reference price approach will tend to become

¹² See California ISO April 2005 Annual Report on Market Issues and Performance, at pages 2-19 to 2-20. This report is available on the CAISO's website at <http://www.caiso.com/docs/2005/04/28/2005042815002119535.pdf>.

less effective at mitigating market power as the duration and intensity of market power increases. This is an undesirable characteristic for a market power mitigation tool. Cost-based reference levels do not suffer from this undesirable characteristic, and should therefore be the primary method for setting reference prices.

Another less-than-desirable feature of bid-based reference pricing is its tendency to result in bids that are inflated due to generators' expectations about MCPs. This effect is similar to that resulting from the bidding incentives associated with "as-bid" pricing systems. Since an accepted low-priced bid would depress the reference price, the bidder has an incentives to raise its bid prices to a level just below its expected MCP. Such behavior is particularly harmful to market efficiency during off-peak hours, when it can lead both to higher price volatility and higher costs to consumers.

Conduct and Impact Thresholds

The conduct threshold is currently set at the lower of 200% or \$100 increase over reference price. Often generating units in the CAISO service territory are able to bid high and set high prices, even during a contingency, without failing the conduct test due to high thresholds. That is, they bid within their individual reference level thresholds, no higher than the lesser of \$100/MWh above or three times their reference levels.

In the period between January and September 2004, for example, there were 15 individual price spike hours (with hourly average prices in excess of \$100/MWh and price-to-cost mark-up in excess of 40% of cost). Of these 15

hours, price-setting generating units would have failed the conduct test in only four hours had AMP run then. In reality, AMP did not detect any of these four hours, because the price screen did not predict prices above \$91.87/MWh in those hours and, as a result, the conduct test was not applied.

The CAISO's Department of Market Analysis ("DMA") calculated the ability of the *conduct and impact tests to limit the exercise of system-wide market power* if AMP ran for each and every hour regardless of the predicted price. The analysis found that it is extremely rare for a bid to fail the conduct test (e.g., only four times between January and September 2004) if AMP had been running at all times. Since implementation, the impact test has never been violated, and thus AMP has not yet actually mitigated any bids.

The CAISO believes that the thresholds for conduct and impact tests are often too great to provide effective market power mitigation, especially given the fact that *bid-based reference prices may already reflect some level of market power due to strategic bidding*.

Local Market Power Mitigation

Although local market power mitigation ("LMPM") affects far fewer generating units at a time than system AMP, the CAISO believes that having effective LMPM is extremely important because local market power concerns are much more prevalent. Local market power can arise easily due to transmission outages and other grid conditions, and can sometimes be very long lasting. *Having a strong and effective LMPM system is essential for ISOs and RTOs.*

Decremental Local Power Mitigation

The need for strong and effective LMPM for decremental energy bids mainly arises because of the CAISO's current zonal market structure, which allows Day-Ahead energy schedules that are infeasible with respect to transmission constraints within the zone. These schedules typically have to be adjusted in the Real Time Market as out-of-sequence ("OOS") dispatches are settled on an "as-bid" basis. Often there is limited competition for decremental OOS dispatches and absent effective LMPM for these bids, the CAISO could actually be paying generators to reduce their schedules. The CAISO realizes that the most effective solution to this type of local market power is to implement a market design based on Locational Marginal Price ("LMP") that enforces all the transmission constraints in the forward market and Real Time Market. The CAISO is currently developing an LMP market design, which it plans to implement in February 2007. In the meantime, having effective LMPM for decremental bids is essential.

CAISO's Concerns with the Decremental Reference Levels ("DRLs")

The CAISO's concern with the bid-based methodology has been recognized by the Commission by approval of the competitive screen used in determining DRLs. Under the competitive screen, bid-based DRPs for thermal generating units are used only in those circumstances where over 50% of dispatches are dispatched in-sequence. This screen eliminates the incentive for strategic bidding for generators that fail the screen but as the CAISO has

explained, default cost-based reference levels for all generators would be a better approach.

Incremental LMPM

Current LMPM measures allow for the mitigation of incremental OOS dispatches at prices that exceed the real-time MCP by \$50/MWh or 200% of the MCP. Bids dispatched OOS in excess of this threshold are mitigated to the higher of the MCP or the generating unit's reference price. OOS dispatches must often be made from a relatively small pool of generating units to resolve a locational constraint, and the ability of generation owners to exercise locational market power in such situations remains a concern for the CAISO. The CAISO's current LMPM provisions are not as effective as they could be. In 2004 re-dispatch costs were about \$898,000 lower than what they would have been but for the use of LMPM. This was about 2.2% of the CAISO's incremental re-dispatch costs. One way to measure the degree to which locational market power was exercised is to compare bid prices of OOS dispatches to the marginal costs of this generation and the MCP, which is based on in-sequence dispatches. Results of this analysis indicate that, during 2004, the dominant supplier of OOS incremental energy earned about 15% in excess of the market, calculated as the difference between its actual accepted OOS bid and the higher of (a) the generator's marginal cost, or (b) the MCP. This 15% mark-up translates to about \$9.5 million of about \$64 million in total OOS energy sales. If the dominant generator's bids were mitigated using a 10% adder to the generator's marginal costs, the dominant generator would have earned about \$5.7 million, *i.e.*, about

9% of \$64 million of OOS energy sales. The CAISO believes that cost-based reference levels are more appropriate than bid-based reference levels in these circumstances.

APPENDIX 2

Comments on
“Establishment and Use of Reference Prices for Mitigation
in Markets Operated by Regional Transmission Organizations,”
Federal Energy Regulatory Commission Docket No. PL05-6-000

by
Frank A. Wolak, Chairman *
Market Surveillance Committee of the California ISO

May 2, 2005

1. Introduction

These comments respond to the Federal Energy Regulatory Commission’s (FERC) “Notice Inviting Comments on the Establishment and Use of Reference Prices,” issued April 1, 2005. First we state the goals of market power mitigation. Next we discuss the ability of bid mitigation in general and the Automated Mitigation Procedure (AMP), in particular, to achieve these goals. We then compare the properties of typical approaches used to set reference prices for mitigated generation units. We conclude with design recommendations for market power mitigation mechanisms that limit the market inefficiencies that result from their application. Specifically, we recommend that FERC consider alternative approaches to the current AMP mechanisms used in the eastern ISOs.

2. Goal of Market Power Mitigation Mechanisms

Market power mitigation is a form of regulatory intervention. Like all regulatory interventions, it is justified only when the expected benefits from intervention exceed the costs of intervention. Because all regulatory processes are necessarily imperfect, designing a market power mitigation mechanism requires balancing the costs and benefits of an imperfect market mechanism that reflects the exercise of unilateral market power by one or more suppliers against the costs and benefits of an imperfect regulatory mechanism. Viewed from this perspective, the goal of market power mitigation is to replicate as closely as possible the market outcome that would occur if all suppliers faced significant competition for their output. Unfortunately, the structure of the transmission network, the existence of scale economies in electricity production, and the fact that market participants typically own a number of generation units in fairly tight geographic clusters create system conditions when competition cannot be relied upon to discipline the actions of some market participants. Under these circumstances, consumers would be subject to the exercise of significant unilateral market power and the unjust and reasonable prices that result without an effective market power mitigation mechanism.

However, there is growing concern that over-mitigation of suppliers is not in the long-term interests of consumers. That is because the market power mitigation mechanisms typically focus on limiting the incidence of extremely high prices while doing little to prevent higher prices the vast majority of the hours of the year. Basing reference prices for mitigated units on

* These are draft comments that were prepared in consultation with the other members of the Market Surveillance Committee (MSC), Brad Barber, James Bushnell and Ben Hobbs, based on previously submitted MSC opinions.

functions of accepted bids by that generation unit or including *ad hoc* adders in these reference prices increases the likelihood that market prices will be higher than they would in the absence of the market power mitigation mechanism during the vast majority of hours of the year.

We believe there are two major shortcomings with the AMP-like mechanisms that currently exist in the eastern ISOs: (1) the use of reference prices based on accepted bids and (2) the use of *ad hoc* bid adders in setting mitigated bid levels. Both of these features of the AMP mechanisms that exist in eastern ISOs are inconsistent with the goal of market prices being as close as possible to those that would exist if all suppliers faced effective competition.

3. Shortcomings of Automatic Mitigation Procedures

The experience of the California market with its system-wide AMP mechanism has failed to convince us that it is effective for limiting anything but isolated, excessive exercises of unilateral market power. These are the same types of events that are mitigated by the bid cap in the energy market. However, with the system-wide AMP mechanism, this mitigation comes at the expense of sanctioning, and perhaps even promoting, more widespread and subtle forms of market power. For example, under the California ISO's existing system-wide AMP mechanism,¹ all suppliers are allowed to bid the lower of \$100/MWh higher than or 200% of their reference level and not be subject to mitigation by the system-wide AMP mechanism. These conduct thresholds provide suppliers with substantial discretion to raise market prices without triggering mitigation. Even though the California ISO's system-wide AMP mechanism has failed to mitigate any bids in the real-time market, significant amounts of unilateral market power could have been exercised while this AMP mechanism has been in place.

In our view, an AMP mechanism with the large conduct thresholds described above does not constitute adequate mitigation of the unilateral market power a supplier might possess, because this mechanism allows a supplier to move market prices above competitive levels enough to impose significant consumer harm without violating the conduct thresholds. Therefore, this AMP mechanism allows substantial system-wide market power to be exercised without triggering mitigation.

It is unclear to us what is accomplished by specifying conduct and impact thresholds, if one is willing to make the very reasonable assumption that suppliers exercise all available unilateral market power. For example, the interaction of two suppliers exercising all available unilateral market power subject to the conduct and impact thresholds in a system-wide AMP mechanism can cause each supplier to exercise significantly more unilateral market power than would be possible without conduct and impact thresholds. If both suppliers bid higher, even if both bids violate the conduct thresholds, neither will violate the impact threshold, because removing the bids of either supplier has little impact on the market-clearing price.

For this reason, we favor market power mitigation mechanisms that intervene only when a supplier is determined to possess sufficient market power to justify interfering with market mechanisms, rather requiring them to violate a conduct threshold and an impact threshold before

¹ Although the California ISO proposes to eliminate the present system-wide AMP procedure on Day 1 of the implementation of the Market Redesign and Technology Upgrade, the California ISO may implement it later in conjunction with a higher energy bid cap. See California ISO, "MRTU White Paper," www.caiso.com/docs/2005/02/23/200502231639176611.pdf.

being mitigated. We emphasize that this does not mean we believe that mitigation should take place more frequently than it would under an AMP-like mechanism. In fact, in our recent opinion on the California ISO's Market Redesign and Technology Upgrade (MRTU) Conceptual Filing, we recommended against implementing an AMP mechanism on a system-wide basis.² We do not believe that the system-wide AMP mechanism is worth the potential cost in terms of the market inefficiencies it introduces at the current level of the bid cap on the California ISO market. In that opinion, we emphasized that system-wide market power is best handled throughout forward contracting at various time horizons in advance of delivery for energy and ancillary services. Our opinion stated that market power mitigation mechanisms should be used only in those instances when the barriers to entry in certain locations in the transmission network are sufficiently large that the threat of new entry cannot be used to discipline the pricing behavior of suppliers of forward contracts for energy and ancillary services at those locations.

Our preferred local market power mitigation (LMPM) mechanism is one that requires that two conditions be satisfied in order for a supplier's bid to be mitigated. First, the supplier must be deemed able to exercise substantial local market power. Second, replacing the supplier's actual bid with a mitigated bid is expected to result in a market outcome that is closer to the outcome that would result if the mitigated units faced effective competition to supply electricity. This second criterion implies we do not advocate mitigation unless the use of a mitigated bid in place of the supplier's actual bid is expected to result in prices closer to competitive levels. We believe that an appropriate horizon for this expectation is an annual basis. *By this we mean that averaging the market prices over all of the hours of the year that the supplier's bid is mitigated, yields prices at that location that are closer to the competitive benchmark average prices at that location than the average market prices that would result if the supplier's actual bid was used to set the price during these same hours.*

4. Methods Used to Set Reference Prices

The MSC also has expressed substantial concern in a previous opinion about using functions of previously accepted bids to set AMP reference levels for mitigated bids.³ This imposes a cost on a supplier for submitting a low bid, because this bid is likely to reduce that supplier's reference level and therefore limit the extent to which the supplier can raise prices during other hours of the year. For example, if a supplier's AMP reference level is set at the mean of accepted bids over the past 90 days, one can imagine a circumstance where a very low accepted bid could significantly reduce that supplier's reference level. This lower reference level would limit the ability of the supplier to raise its bid and therefore the price it receives for selling electricity without exceeding the conduct threshold. For this reason, we believe that setting AMP reference levels based on accepted bids limits the incentives for suppliers to vigorously compete during competitive periods. Using this mechanism to set reference levels results in an AMP mechanism that is likely to raise average prices in the majority of periods and reduce prices only during those relatively rare periods when the supplier is pivotal.⁴ Therefore, an AMP

² "Opinion on California ISO's Market Redesign and Technology Upgrade (MRTU) Conceptual Filing," April 26, 2004 (available at <http://www.caiso.com/docs/2005/04/26/2005042611125729395.pdf>).

³ "Market Power Mitigation Under Locational Marginal Pricing", MSC Opinion, Nov. 23, 2004, (available at <http://www.caiso.com/docs/2004/11/23/2004112316123829554.pdf>).

⁴ The AMP mechanism is a unique tool in the portfolio of economic regulation whose potential to produce unintended consequences is not well understood. For example, the AMP mechanism provides incentives to make offer curves more 'flat' because firms benefit from raising the offer price of infra-marginal units that they are

mechanism that sets reference prices using functions of previously accepted bids or includes *ad hoc* adders in cost-based reference prices is likely produce higher annual average prices than would exist in its absence.

Specifically, suppose that in the absence of an AMP mechanism a supplier with a minimum variable cost of production of \$30/MWh is able to exercise unilateral market power and set a price at their location equal to \$100/MWh during 5 percent of the hours of the year. In the remaining 95 percent of hours, this supplier faces significant competition and its bid is usually equal to or close to the market-clearing price at its location, so that the unit sells its output at average price of \$35/MWh. Suppose that with an AMP-like system-wide market power mitigation mechanism this supplier is mitigated 20 percent of the hours of the year and is allowed to bid \$75/MWh, a \$45/MWh reference price plus a \$30/MWh bid adder (a level that is consistent with the bid adders currently used in the eastern US markets). Suppose that because of this bid adder and the existence of an AMP-like mechanism, whenever this supplier produces it sets the price at its location, so that it sells at price of \$75/MWh during all of the hours that it is mitigated. Because this supplier's reference prices are based on accepted bids from its unit, it is reluctant to bid below \$40/MWh during the other hours of the year and as a result it sells at, say, an average price of \$42/MWh in the remaining 80 percent of hours during the year. The annual average price without the local market power mitigation mechanism is \$38.25/MWh, versus \$48.60/MWh for the case of the local market power mitigation mechanism with a \$30/MWh bid adder. Although prices are more volatile without the market power mitigation mechanism in place, average prices over the year are lower. Because consumers purchase electricity for use throughout all hours of the year, they would clearly prefer the market without the system-wide AMP-like mechanism to the one with the \$30/MWh bid adder and reference prices set using accepted bids.

The Department of Market Analysis at the California ISO has documented examples of suppliers using this strategy to increase the incremental energy (INC) reference level and decrease their decremental energy (DEC) reference levels significantly in order to have the freedom to exercise additional local market power within the context of the California ISO's existing AMP mechanism.⁵ In both situations, this strategy is made attractive by the fact that previously accepted INC and DEC bids are used to set INC and DEC reference levels

An alternative approach to set reference bids is to allow a fixed adder on top of variable cost. A motivation for proposals of such adders is the maintenance of adequate revenues for generators. However, we believe that there are more effective mechanisms for ensuring revenue adequacy that do not have the disadvantage of distorting LMPs. We strongly urge the FERC to avoid setting locational marginal prices above competitive levels by including *ad hoc* bid adders in mitigated bid levels as a means for providing adequate revenues to owners of mitigated generation units.

confident will be accepted in the market. Thus, AMP provides incentives similar to pay-as-bid systems to raise bids to the level of market clearing prices. Without AMP, firms are largely indifferent to the offer price of a unit, conditional on the fact that it is accepted. With AMP, a higher offer price for an accepted unit raises its reference price and allows more flexibility for bidding that unit in other hours.

⁵ See Chapter 2 of the California ISO DMA's 2004 *Annual Report of Market Issues and Performance*, April 2005 (available at <http://www.caiso.com/docs/2005/04/28/2005042814343415812.html>).

For the reasons discussed above, we do not believe that even 10% bid adders should be included in cost-based reference bids. A scheme that systematically biases the bids of mitigated generation units upward relative to the ISO's best estimate of the unit's minimum variable cost of supplying electricity does not achieve the goal of market power mitigation discussed above. Generation units that face sufficient competition will bid close to their minimum variable cost. Combining these bids with mitigated bids set significantly above their minimum variable cost of supplying energy will result in higher prices as well as overuse of units facing significant competition.

One might think that a 10 percent adder is relatively small, but it is important to emphasize that if 100 MW generation unit is operating 2000 hours per year with a 10 percent adder on top of a variable cost estimate of \$50/MWh, this implies annual payments in excess of these variable costs of \$1 million to that generation unit's owner. In addition, this mitigated bid level will set higher prices for units located near this generation unit, further increasing costs to consumers.

Including *ad hoc* bid adders or other adjustments in the computation of mitigated bid levels also increases the incentives for unmitigated suppliers to distort their bids above their minimum variable cost. These suppliers recognize that the mitigated bid must be dispatched so they face little risk of a reduced amount of energy sold but a substantial likelihood of achieving a higher price for their energy by bidding higher than their minimum variable cost of supplying energy. This bidding behavior risks greater distortion from an efficient dispatch of the units in the control area, all because of the use of this *ad hoc* bid adder.

The ISO should design a mechanism for setting the mitigated bid level for a supplier that balances the two competing goals common to all regulatory price-setting processes. First the mitigated bid should allow the generation unit owner the opportunity to recover the minimum variable cost of supplying energy. Second this mechanism should provide the strongest possible incentives for the supplier to provide the necessary energy at minimum cost.⁶

5. Recommended Methods for LMPM and Setting Reference Levels

Based on our analysis of the market power mitigation mechanisms in California, the eastern ISOs and those in other wholesale electricity market around the world, we have the following recommendations. First, we see limited long-term benefits to consumers from system-

⁶ One example of this approach is for the ISO to establish a benchmark variable cost estimation procedure based on validated heat rates and variable operating and maintenance costs for each gas-fired generation unit in California. This validated heat rate would be multiplied by a benchmark daily price of natural gas delivered to the generation unit. The Henry Hub price plus the regulated cost of transporting natural gas from Henry Hub to this generation unit, including the relevant intrastate gas transmission and distribution charges, could be used as this benchmark natural gas price. The mitigated bid level for this unit could then be set equal to the heat rate times this benchmark delivered price of natural gas plus a benchmark variable operating and maintenance charge for generation units of this technology and vintage. If the supplier believes that it can produce the necessary energy at a lower variable cost, then it should be able to keep the difference between this benchmark variable cost and its actual variable costs. This scheme for setting mitigated bids would provide strong incentives for the least-cost operation and procurement of natural gas by mitigated generation units. Because it uses the ISO's best estimate of the minimum variable cost of that generation unit, this mechanism also limits the distortions in the dispatch introduced as a result of mitigating generation units because they possess substantial local market power.

wide AMP mechanisms. System-wide short-term market power is best dealt with through long-term contracts for both energy and ancillary services between suppliers and load-serving entities. Market power mitigation mechanisms should focus on limiting the opportunities for suppliers to exercise local market power by exploiting the substantial barriers to entry at certain locations in the transmission network. These local market power mitigation mechanisms should focus on identifying system conditions which satisfy the two-tier test for mitigation given above, without a conduct or impact thresholds. Instead, a generation unit's bid should be mitigated if it is deemed to possess substantial market power and using that unit's reference price is expected to produce a market price closer to the competitive benchmark price than the unit's actual bid.

We strongly urge FERC to eliminate setting reference prices based on functions of previously accepted bids. FERC should not include any *ad hoc* adders in cost-based reference prices. Including sizable bid adders in the reference prices of units that possess local market power introduces significant distortions into the dispatch process, which impacts how these units are used and how other units in the system facing substantial competition for their output are used. In addition, the use of the bid adders will introduce even greater distortions into market outcomes as final demand becomes a more active wholesale market participant.

Our preferred approach for setting reference prices is to use the ISO's estimate of the minimum variable cost of supplying energy from the mitigated generation unit. This mechanism should provide strong incentives for the unit owner to produce the necessary output at the lowest possible cost. This can be accomplished using benchmark heat rates, input fuel prices and variable operating and maintenance costs to set the reference price level for that generation unit, rather than the incurred input fuel costs or variable operating and maintenance costs of the generation unit. These minimum cost-based reference prices should not include *ad hoc* bid adders. For hydroelectric generation units or other energy limited resources, reference prices should be set based on bilateral negotiations between the Department of Market Analysis at the California ISO and the market participant using principles of economic analysis for deriving efficient prices. For example, for energy limited resources, reference prices should be based on the opportunity cost of supplying energy from the mitigated energy limited unit.

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list for the captioned proceeding, in accordance with Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California, on this 2nd day of May, 2005.

/s/ Anthony Ivancovich
Anthony Ivancovich