(ATTACHMENT B)

Memorandum

To: Market Issues/ADR Committee

From: Terry M. Winter, President and Chief Executive Officer

CC: ISO Board, ISO Officers

Date: August 19, 1999

Re: ***Price Cap Policy / Price Volatility Limit Mechanism (PVLM)***

EXECUTIVE SUMMARY

This matter requires a Board action. Currently, the ISO has in place price caps of $250/MW for ancillary services (A/S) capacity and $250/MWh for imbalance energy. In June, the Board voted to implement a Price Volatility Limit Mechanism (PVLM) upon lifting the current $250 price caps,[1] to occur upon the later of September 30, 1999, or the completion of a four-week shake-out of the Phase I market redesign software implemented on August 17.[2]

The resolution directed Management to develop a detailed proposal for implementation of PVLM, with input from stakeholders and the Market Surveillance Committee, for the Board's consideration at the August meeting. The Board expressly directed Management to consider the need for damage control caps, measures and remedies for market power, and mechanisms used in other markets. In light of substantial stakeholder input, however, Management considered both PVLM design and alternatives in developing our recommendation. Specifically, we believe final Board action should be based on consideration of at least the following four options:

- **Option 1. Fixed price caps increasing in two steps.** This option would continue the current $250 caps until the later of shakeout of the redesign software or September 30, consistent with the Board's June 1999 resolution. The caps would then increase to $500 and maintain that level to allow the ISO to observe market performance through the fall and winter months. On June 1, assuming pre-dispatch and netting out of Reliability Must-Run (RMR) energy have been implemented, the caps would increase to $1000 for the summer 2000 peak season.

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[1] Although the discussion in this memo refers explicitly only to the ancillary services and imbalance energy markets, it is understood that the price caps or price volatility limit mechanism would also apply to the adjustment bids that are submitted for congestion management and to the default usage charge that applies to congested inter-zonal pathways.

[2] Two elements of market redesign, Analope and No-Pay, were not implemented on August 17 and their delivery dates have not yet been determined. Management's recommendation is not to wait for Analope and No-Pay to implement the revised price cap policy, as the proposed September 30 date for lifting the current caps is after the end of the peak summer season. We therefore believe that any risk to the market from not waiting for the full complement of A/S redesign elements would be small and would not outweigh the need to start observing market performance under higher price limits.

- **Option 2. Simple price volatility limit mechanism (PVLM).** This option would feature the same phases as Option 1, but would start with a floor of $250 on September 30 and go to a floor of $1000 in the spring. The daily price limits would move above these floor levels, in response to market-clearing prices hitting the limits, by a fixed increment amount to be specified by the Board. When prices remain more than one increment below the limit for an entire day, the price limits would move down again, but would never go below the current floor. Under this option the price limit at any time would be the same for all ISO markets, and would move only from one day to the next, remaining fixed for the entire day. Further details on how this option would work are provided in the body of this memo.
- **Option 3. Damage control price caps only.** This option would revert to the November 1998 Board policy, which stipulated that absent further Board action, price caps would rise to $2500 on October 1, 1999.
- **Option 4: No action.** If the Board deadlocks and takes no action, we would be required to implement PVLM but would not have a Board-approved design to implement it. We believe it would be extremely difficult to convince FERC to extend the ISO's authority to impose caps beyond the November 15 expiration date currently in effect if the Board has deadlocked. [3]

The Department of Market Analysis recommends implementation of a simplified PVLM (Option 2), to provide empirical evidence on the extent to which a moveable price limit attracts bids attempting to bump the limit up. Market Analysis also notes that there is widespread use of similar mechanisms in mature markets, another basis for seeking experience with such mechanisms in our markets should there be a need for such a mechanism over time.

Management's recommendation, however, differs. When we recommended the PVLM approach, we believed it presented a more palatable mechanism to bridge the interim period between implementation of the redesign software and the end of a full summer of experience under redesign. The substantial input from stakeholders and internal analysis since then convince us that on balance a simple staged price cap approach is preferable because it (1) is the simplest and least expensive to implement, and (2) makes it clear to the market that the limits are temporary in nature. Thus, Management recommends Option 1 -- fixed price caps increasing in pre-specified steps. In conjunction with this option, Management recommends a "safety net" provision that authorizes fast action by the ISO to lower price caps in the event of a market crisis, with follow-up notification and analysis to be presented to the Board.

Management's recommendation is captured in the following motion:

> ***MOVED, that the Committee recommends that the Board rescind the earlier directive to implement a Price Volatility Limit Mechanism at this time and:***
>
> ***(1) raise the current price caps in the ancillary services and real-time energy markets to $500 upon the later of completion of four weeks shakeout of the Phase I market redesign software or September 30, 1999;***
>
> ***(2) raise price caps to $1000 on June 1, 2000 assuming implementation of pre-dispatch and netting out of Reliability Must-Run energy (or on such date in any event, if FERC has rejected or disapproved pre-dispatch and netting prior to such date);***
>
> ***(3) maintain the $1000 caps through summer 2000;***

[3] Unless FERC acts soon on our June 25 request for rehearing on price cap authority, which asked for an extension through February 15, 2000 to allow time for the ISO to observe market performance under market redesign and assess the MSC report due on October 15, we would need to file a Tariff change implementing a price cap policy by September 15 to obtain FERC action prior to the November 15 expiration date.

(4) adopt a "safety net" provision whereby Management would be authorized to lower price caps without Board action upon substantial evidence that the affected market is not workably competitive, with follow-up notification and analysis to be presented to the Board; and

(5) direct Management to file the necessary Tariff language with FERC to implement the policy adopted in this motion.

ISSUE STATEMENT

The issue is straightforward. Currently, the ISO has $250 caps on ancillary services (A/S) capacity and real-time (RT) energy as the result of substantial evidence that these markets are not workably competitive at all times. Because FERC requires a further filing if the ISO wishes to extend caps beyond November 15, the Board must decide what continuing authority it wishes to seek and how to implement that authority.

Background – The Original Price Cap Policy

In November 1998, when the Board decided to extend the caps, the expectation was that they would be raised to $750 upon implementation of A/S market redesign and reform of reliability must-run (RMR) contracts, and then raised again to $2500 on October 1, 1999. When that policy was adopted, it was expected that A/S redesign and RMR contract reform would be completed by May 1999, so that new software could be tested prior to peak summer loads. Summer 1999 would then provide a full peak season's experience with redesign elements in place and the $750 price cap in effect before lifting the cap to $2500.

As it turned out, most of the A/S redesign elements were implemented in mid August, and the last two elements (Analope and No Pay) will be implemented some time later. With this change in schedule, we lost the opportunity for both a pre-peak-season shakeout of the new software and a summer's experience with the redesigned systems and an intermediate-level price cap. We believe both conditions were at least implicit conditions for lifting the price caps in two stages as the Board originally intended.

The PVLM Proposal

When it became clear that these implicit conditions could not be met, Management raised with the Board the issue of whether and how to modify the 1998 policy. We proposed PVLM in June believing its similarity to mechanisms in place in other commodity markets would make it a more acceptable interim mechanism to temper price volatility while we gain experience with the market redesign. At its June 1999 meeting, the Board voted to retain the current $250 price caps for a four-week shake-out period, or until September 30, and upon lifting the cap to implement a Price Volatility Limit Mechanism (PVLM) at the initial level of $250. The Board's June 1999 resolution directed Management to develop, with input from stakeholders and the Market Surveillance Committee (MSC), a detailed PVLM proposal for the Board's consideration at the August meeting, to seek limited rehearing of FERC's May 26, 1999 order terminating the ISO's price cap authority as of November 15, 1999, and to request an extension of that authority to February 15, 2000, to allow the ISO to assess the performance of market redesign and review the October 15, 1999 report of the MSC in determining the need for further use of caps or some other form of limits on price movements.

Lessons from Other Markets

The ISO Department of Market Analysis engaged the services of two consultants to advise on the mechanisms used in other markets, specifically commodity and futures markets.

Professor Jeffrey Williams, of the University of California at Davis, has done extensive research on commodities and futures markets. He presented some examples of the use of price move limits at the July 20 stakeholder meeting, participated in informal discussions with staff, and offered comments and insights on the ISO's PVLM approach. His article

prepared for the ISO, "Price-move Limits in Commodities and Futures Exchanges, and their Relevance to the California ISO Markets," is provided as Attachment A to this memo.

Richard L. Sandor has extensive experience in developing new instruments to trade in financial and commodity markets, and is recognized as a founder of the interest rate derivatives markets. He has been an officer of the Chicago Board of Trade, and has served on committees of the Chicago Board of Trade, the Chicago and New York Mercantile Exchanges, and the Commodity Futures Trading Commission. In a series of conference calls with ISO staff, Dr. Sandor provided information and insights about price-move limits and other means by which mature exchanges ensure stability and confidence, and commented on the ISO's approach to price limits.

In summary, the lessons learned from these other markets are as follows:

1. There are many limited analogies that can be drawn between other markets and the ISO markets, but no analogy fits really well due to the uniqueness of the ISO markets and the special characteristics of electricity. In particular, commodities and futures markets continuously trade the same contract, representing the same product. For example, in the Nymex electricity futures market, a MWh of electricity to be delivered at COB in the month of January is a product that may be traded countless times in the months leading up to January. In the ISO markets, in contrast, each hour represents a different product, and the trades of that product occur at only a few discrete times, each time based on a single submission of bids. This is a major reason why attempts to draw analogies to other markets break down.
2. Price Move Limits (PMLs) are widely used in other markets, and where they are used the clear preference is for transparent, predictable rules rather than ones that require discretionary action. In most cases PMLs only change from one day to the next rather than within days, although in some markets there are distinct "trading sessions" within a day and PMLs may change from one session to the next.
3. Usually PMLs act to stop trading when they are hit, not because of any requirement to stop trading, but because buyers and sellers cannot agree on a price at which to transact. Because of continuous trading of the same product, such a stop only means a pause in trading after which parties may come back and continue bidding, usually with expanded price limits. This is very different from the ISO markets where the ISO is required to obtain the resources it needs at the time it needs them. It is not an option to stop trading in an ISO market and come back an hour or two later to try and agree on a price.
4. Although the purpose of PMLs in commodity and futures markets is to enhance the stability of the market, an objective shared with price limits in the ISO markets; these other markets do not characterize such stability as protecting buyers at the expense of suppliers. Rather, these markets recognize that the risk of default is a threat to buyers and sellers alike, and they implement PMLs to limit the risk of default. See Attachment A for a discussion of how PMLs serve to limit the size of the daily margin calls to which futures traders are subject, and thus to limit the risk of financial default. In the present context, a PVLM or similar mechanism would protect the supplier whose plant is suddenly unable to deliver on a bilateral contract and has to procure replacement supply in a rapidly rising real-time market.
5. Even when PMLs are absent, for example in markets for physical delivery, there are informal trading rules, conventional practices, and contract provisions that prevent extreme price movements. For example, physical delivery of an agricultural commodity is commonly priced by quoting a margin above or below a reference futures contract. Thus, a grain trader who wants to take delivery in Peoria may negotiate a delivered price as a differential to a futures contract that is written for delivery in Chicago, and the size of the price differential will be kept within reasonable limits not by formal rules but by conventional practices that have evolved and become standardized as the markets have matured. Such practices are based on the recognition that traders have long-term trading relationships with one another, the benefits of which outweigh any short-term profits that may be captured by extracting the highest possible price in a given situation.

For many highly perishable fruits and vegetables, processors and shippers have long-term relationships, even formal contracts, with particular growers. The buyers throughout a particular season pay the spot price for all deliveries day by day, but sometimes only up to a cap previously agreed upon. Many contracts, including formally designed futures contracts, include provisions allowing the seller to substitute another grade of product or another delivery location at specified discounts, which provisions necessarily limit any price spike. In some instances, effective price limits are incorporated into contracts in the form of *force majeure* clauses that protect buyers and sellers from facing exorbitant costs due to unforeseen events. The point is that formal price limits are not needed because other mechanisms have evolved in mature markets that play essentially the same role.

6. PMLs are not relied upon exclusively to control market behavior, but are part of a complex of features and mechanisms that ensure behavior and performance in mature markets. Some of these other mechanisms are position limits, "market-making" responsibilities of special types of traders, formal and informal codes of conduct, and strong surveillance, investigation and enforcement functions.
7. Most exchanges have a select group of traders, for example, the "clearing members" of futures exchanges who are franchised intermediaries between the market at large and the central clearing house through which all trades are formally settled. These clearing members have well-defined responsibilities to behave in ways that enhance market efficiency and ensure compliance with market rules. Thus their actions must look beyond their own financial self-interest and serve the interests of the market institution. Because of their franchise position, such traders typically have access to proprietary information and other privileges that regular traders do not have, which further motivate their having special responsibilities. In many ways the scheduling coordinators play a role in the ISO markets similar to the role of clearing members in futures exchange.
8. Mature markets are often self-regulating organizations (SROs). In SROs, such as the Chicago Board of Trade, the trader members assume responsibility for and subject themselves to enforceable rules governing the behavior of traders. Under the SRO model, the members will designate a Business Conduct Committee (BCC) which is composed of some of the members of the exchange and has authority to investigate problems and assess severe penalties. Members willingly accept the possibility of being subject to potentially severe, discretionary penalties because of the value of the BCC function in maintaining an orderly market.

OPTIONS CONSIDERED

Four Options

As noted above, Management commenced the two-month stakeholder process with the intent to develop the specifics for a PVLM. As the result of the process, we believe the Board's consideration should be expanded to the following four options:

- **Option 1. Fixed price caps increasing in two steps.** This option would continue the current $250 caps until the later of shakeout of the redesign software or September 30, consistent with the Board's June 1999 resolution. The caps would then increase to $500 and maintain that level to allow the ISO to observe market performance through the fall and winter months. On June 1, assuming pre-dispatch and netting out of Reliability Must-Run (RMR) energy have been implemented (or in any event if the proposal is rejected by FERC), the caps would increase to $1000 for the summer 2000 peak season.
- **Option 2. Simple price volatility limit mechanism (PVLM).** This option would feature the same phases as Option 1, but would start with a floor of $250 on September 30 and go to a floor of $1000 in the spring. The daily price limits would move above these floor levels, in response to market-clearing prices hitting the limits, by a fixed increment amount to be specified by the Board. When prices remain more than one increment below the limit for an entire day,

the price limits would move down again, but would never go below the current floor. Under this option the price limit at any time would be the same for all ISO markets, and would move only from one day to the next, remaining fixed for the entire day. Further details on how this option would work are provided below.

- **Option 3. Damage control price caps only.** This option would revert to the November 1998 Board policy, which stipulated that absent further Board action, price caps would rise to $2500 on October 1, 1999.
- **Option 4. No action.** If the Board deadlocks and takes no action, we would be required to implement PVLM but would not have a Board-approved design to implement it. We believe it would be extremely difficult to convince FERC to extend the ISO's authority to impose caps beyond the November 15 expiration date currently in effect if the Board has deadlocked. Given these implications, Option 4 is not included in further discussion.

These options can be summarized as follows:

	Option 1	Option 2	Option 3
Mechanism	Fixed Price Caps	Simple PVLM	Damage Control
Level on 9/30/99, or upon shake-out of redesign	$500	$250 floor Increment to be specified	$2500 (October 1)
Level in Spring 2000, with RMR Netting Out	$1000	$1000 floor Increment to be specified	$2500
Other features	Safety Net	Safety Net	Safety Net

Additional Details for PVLM (Option 2)

The PVLM, as presented to the Board at the June 1999 meeting, consists of the following features (key terms underlined):

- a moveable price volatility limit (PVL), *i.e*., an upper limit on bids and market-clearing prices (MCPs) that applies to all ISO markets, and that depending on how it is designed may or may not take different values for different ISO markets
- movement rules that determine how the PVL will rise or fall from one day to the next, or even from one hour to the next, depending on whether it was hit by the MCP in an earlier day or hour, or in response to some other specified trigger
- a pre-specified floor level that stops the downward movement of the PVL
- a pre-specified increment, *i.e*., the amount by which the PVL can rise or fall in a single move.

Given these basic elements, there are a number of alternative design strategies that can utilize them. The main design choices relate to how quickly the PVL changes when it is hit, whether PVLs may be set independently for different ISO markets, and whether the variables that trigger PVL movement should be market clearing prices, measures of market power, forecast system load levels, or some combination of these or other variables. The simple PVLM design (Option 2) features a single PVL for all ISO markets. Movements of the PVL respond to ex post real-time energy prices, and the response time is two days. That is, the ex post prices on Day 1 determine the PVL for all bids to supply capacity or energy on Day 3, i.e., the DA bids submitted on Day 2 and the HA and RT bids submitted on Day 3. Under this design, bidders will always know the applicable PVL well in advance of when they must submit their bids, and each hour's BEEP will be consistent in the sense of containing bids that were all submitted subject to the same level of PVL.

This simple PVLM moves the daily PVLs only in response to market clearing prices (MCPs). There are considerable problems to be solved in trying to incorporate market power indicators into an algorithm. At the same time, implicit in this proposal are the assumptions that market monitoring will continue, and that the ISO would take a corrective action such as

lowering the PVL to the current floor level upon evidence that prices were being artificially driven up by exercise of market power or exploitation of a market design flaw.

If the Board chooses to adopt this option, it would have to specify the increment value for the PVLM, that is, the amount by which price limits would increase or decrease in any single move.

DESIGN FEATURES, DECISION CRITERIA, AND TRADEOFFS AMONG THEM

We believe the following is a good summary of the purpose for any price limiting mechanism:

- ***To provide a transition mechanism, with clearly specified stages, from the current regime of fixed price caps on the ISO markets to one of market prices that are free to move in response to market conditions.***
- ***During this transition, the proposed mechanism should:***
- ***Protect the market against non-economic price spikes due to exercise of market power or exploitation of a market design flaw and***
- ***Recognize the limited price responsiveness of loads at present, provide relatively stronger protection in the short run, and gradually increase the exposure of loads to market prices on a specified timetable, to provide proper incentives for load responsiveness to develop.***

This section discusses the major design features and decision criteria considered in developing our recommendation. Because some of these features and criteria are mutually antagonistic, we describe some of the tradeoffs involved in determining the preferred option. Items 1 through 4 are the same criteria that were used in earlier ISO memos on price cap policy to this Board (*i.e.,* in May and June 1999). Items 5 through 10 have arisen in connection with the assessment of the PVLM.

1. ***Protection against non-economic price spikes.*** Given the late August implementation of ancillary services redesign software and maintenance of the current $250 caps for a four-week shake-out period, the market will not have had a summer's experience with market redesign and higher caps to provide some assurance that no serious market design flaws or market power opportunities exist. The mechanism that takes effect upon lifting of the current caps should provide protection against disruptive, non-economic price spikes.
2. ***Incentives for investment in new generation and demand responsiveness.*** Movement of market prices in response to actual supply and demand conditions provides important signals and incentives for generators to invest in new capacity and for loads to develop the capability to respond to prices. The new mechanism should not dampen price movements to the extent that these incentives are excessively reduced.
3. ***Effects on related non-ISO markets.*** It is well recognized that limits on prices in the ISO markets will act as effective limits on prices in related markets, particularly forward energy markets. The new mechanism should take account of such effects and seek to minimize them.
4. ***Policy stability***. The ISO's goal is to raise price limits and ultimately eliminate them (with only a high "damage control" provision) as expeditiously as possible, but with minimal risk that price limits would have to be lowered again once they were raised. Once limits are raised, subsequent lowering would provide disruptive signals to the market and could undermine the credibility and predictability of the ISO's policy. The new mechanism should provide for prudent increases in price limits with minimal risk of having to reverse such increases due to unforeseen market problems.
5. ***Responsiveness to indications of market power.*** Some parties have argued that price limits should not move solely in response to high market clearing prices, but should distinguish between high prices due to actual demand

and supply conditions (for example, at high levels of system load or when significant outages occur) versus high prices due to exercise of market power or exploitation of a market design imperfection. One criterion for evaluating a mechanism should therefore be its ability to link price limit movements to the underlying market conditions that cause prices to rise. At the June Board meeting the Board explicitly directed ISO Management to consider "measures and remedies for market power" in developing implementation details of PVLM. Our full response to this direction is provided below.

6. ***Response time.*** Some parties have expressed concern that a PVLM be able to respond to relatively short-lived price increases that occur, for example, in response to a heat wave. They argue that such price increases represent actual market conditions and should be reflected in the movement of the PVLM within a time frame that is consistent with the underlying conditions. One criterion for evaluating a mechanism should therefore be its ability to respond to such events. It should be pointed out that response time is linked with two other features of PVLM design:

    - ability of bidders to know the applicable limit in advance of submitting their bids. Response time can be shortened by relaxing the requirement that applicable price limits be published prior to the time that bids subject to those limits must be received by the ISO. Bidders not knowing the applicable limits may not be a very great problem if we adopt the principle that bids submitted above the limit are treated as bids submitted at the limit.

    - BEEP stack consistency, that is, having a BEEP stack made up entirely of bids that were submitted subject to the same level of price limit. With quicker response time, any given hour's BEEP will be made up of day-ahead and hour-ahead energy bids associated with ancillary services capacity, supplemental energy bids and adjustment bids, which may have been submitted subject to different limit levels. Again, this may not be a problem if bids above the limit are treated as bids at the limit.

7. ***Keeping resources in the market.*** Some parties expressed a concern that price limits in the ISO markets would cause suppliers to withdraw from the California markets when prices were high or rising rapidly in other markets to which they have access, and could in some circumstances create reliability concerns for the state. This problem could apply both to resources located within California and outside resources that normally supply into California. Closely related to this problem is response time, since a quick-response PVLM design would be better able to accommodate price increases driven, for example, by a heat wave.

8. ***Discrimination among ISO markets.*** Having independent price limits on each of the ISO markets would provide incentives for more supply to come to those markets where scarcity is most severe, thus to alleviate such scarcity. In contrast, one limit that is the same for all ISO markets would not offer this feature.

9. ***Simplicity.*** As we try to incorporate features like rapid response time, discrimination among ISO markets, and specific market power indicators into the PVLM, the mechanism becomes more complex. Some parties have expressed a preference for a mechanism that is simple and easy to predict.

10. ***Implementation.*** Impacts on systems and operations of the ISO and market participants, and the costs of accommodating those impacts, constitute an important consideration in evaluating a proposed mechanism. This issue is closely related to the simplicity of the adopted mechanism.

Measures and Remedies for Market Power

The Board directed Management to look specifically at measures and remedies for market power in developing the details of the PVLM option. Since the exercise of market power can be the cause of the non-economic price spikes the PVLM would protect against, the question of incorporating market power assessments into the PVLM was discussed extensively at the June Board meeting, the July 20 stakeholder meeting devoted to PVLM, the August 6 meeting of the Market Surveillance Committee, and the August 11 Market Issues Forum.

At these meetings, several parties argued that the PVLM should use an indicator of market power to trigger a movement in the limit, rather than triggering only off market-clearing prices (MCPs). Another idea was to invoke PVLM only when there is evidence of market power, and leave price movements unlimited the rest of the time. Another idea was to employ a bid sufficiency test each time the limit is hit, and to raise the limit only when bid sufficiency indicates an absence of market power. However, parties had opposing ideas on how bid sufficiency should be interpreted to indicate the presence or absence of market power.

In the course of these discussions, the main difficulties that were identified regarding the use of market power tests to determine movements in the PVLs were:

(1) how to distinguish exercise of market power from economic price increases due to market conditions

(2) what market power tests or indicators to use, and what thresholds to set as indicative of market power

(3) how the PVL should behave in response to a market power indicator

(4) potential loss of simplicity and transparency of the PVLM.

In light of these difficulties, Management decided on the following approach to incorporate market power considerations in developing its PVLM option. First, to trigger movements in the PVLs based only on MCPs, rather than try to incorporate market power indicators into an algorithm for the PVLM. Second, to continually monitor market performance for evidence of market power abuse, and to specify measures for responding to market power abuse, such as immediately lowering the PVL to the current floor level. Third, to specify a longer-term path for price volatility limits, whereby the floor and increment values would increase in discrete phases over the next year. Along this path the transition from one phase to the next would be tied to specific market improvements or evidence that market power and design flaws had been mitigated. The PVLM Option (Option 2) incorporates these ideas. In addition, all three options discussed in this memorandum would include a safety net provision that authorizes the ISO to respond quickly to market power problems.

EVALUATION OF THE OPTIONS

The following table summarizes Management's assessment of the three options in terms of the first four criteria stated earlier. A rating of "high" means that the option provides strong support for the stated criterion, whereas "low" means that the option does not support or is opposed to the stated criterion. For all options the assessment assumes that the safety net provision would be in effect. For Options 1 and 2 the assessment further assumes staged increases in the fixed caps or PVLM parameters over the coming year, as described above.

	Option 1 **Fixed Caps**	**Option 2** **Simple PVLM**	**Option 3** **Damage Control**
Protect against price spikes	high	high-medium	low
Incentives for investment	medium	medium-high	high
Minimize effects on non-ISO markets	medium	medium	low
Stable policy	high	high	low

POSITIONS OF PARTIES

Review of the Process

Following the Board's direction to obtain input of stakeholders and the Market Surveillance Committee, the ISO conducted a special stakeholder meeting devoted to the PVLM on July 20. Afterwards the ISO prepared a summary of the meeting, plus descriptions of some PVLM design options that captured ideas expressed at the meeting, and distributed this document to market participants for comments. We then collated all comments received and sent these to market participants.

At the August 6 meeting of the MSC, Market Analysis presented straw proposals for precision and simple PVLM design alternatives (Options A and B noted below). As this was a public meeting, several market participants expressed their views and discussed the PVLM with the MSC. Also at this meeting the additional options C, D and E were proposed. Subsequently the DMA prepared a straw proposal with all five design options and sent it to market participants in preparation for the August 11 Market Issues Forum (MIF). The MIF agenda did not allow as much time for PVLM as parties desired, so the ISO created a "chat room" on the web site to allow parties to post and respond to any further comments.

The five options presented in the DMA straw proposal were:

- Option A. Precision PVLM design, with limits that could move within the day, within a few hours of being hit.
- Option B. Simple PVLM design, similar to Option 2 presented earlier in this memorandum.
- Option C. Fixed price caps increasing in pre-specified stages, similar to Option 1 presented earlier in this memorandum.
- Option D. Neither fixed caps nor PVLM, but ISO discretion to act in the event of market power abuse or a design flaw, similar to the safety net discussed above.
- Option E. Moveable price caps which increase at higher levels of forecast system load.

Summary of Parties' Comments and Alternative Proposals Offered

This section briefly paraphrases the positions and alternative proposals presented by parties in the course of the stakeholder process. This summary does not attempt to identify or tally all the parties who expressed a given view, but only to capture the diversity of views and suggestions expressed. The complete, verbatim comments of all parties who submitted them will be made available to the Board electronically.

- A group of new generation owners (Calpine, Duke, Dynegy, Reliant, Southern, Williams) proposed that existing caps be lifted and not replaced with either higher caps or a PVLM once market redesign is implemented. The ISO should, however, retain a safety net as an insurance measure, and should facilitate development of market-based solutions including inter-SC trades and self-provision of A/S, and load participation in A/S markets. APX and New Energy are similarly opposed to price caps and PVLM.
- SCE proposed implementing a PVLM with $250 floor and $50 increment, with separately moving limits for the day-ahead and real-time markets. When current price limits are hit they would go up the next day, except in cases where bid sufficiency in the given market was above 125 percent. Subsequent changes to the PVLM parameters should be determined after evaluating the October 15 MSC report and the performance of the A/S market redesign and RMR netting out under high load conditions.

- PG&E favors a $250 floor and $25 increment, particularly because of limited price-responsiveness of demand. They say that it is premature at this time to determine whether PVLM should be a temporary measure or should also be considered for a continuing role when the ISO markets are more mature.
- The Office of Ratepayer Advocate (ORA) proposed maintaining a fixed cap for another year to obtain a full summer's experience with market redesign. If PVLM is implemented, ORA recommends using a $50 increment. Alternatively, ORA recommends considering a moveable price cap which increases at higher levels of forecast system load, as in Option E noted above.
- Southern Company Energy Marketing opposes price caps and the PVLM. If PVLM is implemented, however, it should be simple in design, should not incorporate bid sufficiency indicators, and should be able to move on an hour by hour basis so that prices could rise to their maximum "damage control" level within a single day.
- PG&E Energy Services supports the use of a damage control price cap but not a PVLM or lower caps. They argue that the period of the legislated rate freeze is a good opportunity for learning about price volatility while ratepayers are protected from the impacts of high prices.
- MZA prefers the ISO discretion option, with predefined conditions for when the ISO can intervene, *excluding* unplanned outages, high system loads, and under-scheduling of loads.

Market Surveillance Committee Position

The MSC feels that because of remaining market design flaws, the lack of demand price responsiveness, and the absence of sufficient flexibility in the current market structure for demand to engage in forward financial contracting to protect itself from high spot prices for energy and ancillary services, it is necessary for the ISO to maintain limits on price movements in its markets. A full statement of the MSC views is contained in the "Memorandum on maximum purchase prices in energy and ancillary services markets in California," which the MSC prepared in conjunction with the Market Monitoring Committee (MMC) of the California Power Exchange (PX). This memo was prepared for filing at FERC in support of the ISO's June 25 application for partial rehearing on the subject of price cap authority, as moved by this Board on June 24, and is provided as Attachment B to this memorandum

Department of Market Analysis Position

Market Analysis staff (DMA) took the technical lead on this project, prepared design options and straw proposals for discussion at stakeholder meetings and the Market Surveillance Committee, examined the mechanisms used in other markets to limit price movements, and assessed the various alternatives. ***The DMA has concluded that although either Option 1 or Option 2 described above would be acceptable, Option 2 would be preferable.***

Both options satisfy the primary purposes to which the PVLM is addressed: to protect the market against price spikes due to exercise of market power or exploitation of a market design flaw; and, to provide protection in the near term for loads whose price responsiveness is quite limited, but to gradually increase the exposure of loads to market prices to provide incentives to increase price responsiveness. Of the two alternatives, Option 1 has the advantage of simplicity and predictability. Option 2, however, could provide additional useful information on market performance and bidding behavior, for example, to provide empirical evidence on the extent to which a moveable price limit attracts bids attempting to bump the limit up. Because of the lower loads observed during the fall and winter, this would be a low-risk time period for assessing market performance and bidding behavior in relation to a PVLM.

Moreover, since DMA research has discovered widespread use of similar mechanisms in mature markets, some direct experience with a PVLM in the ISO markets would be valuable if and when the ISO determines there is a need for such a

mechanism to ensure market stability once the transition period is over and the ISO markets are more mature. By choosing a relatively simple PVLM design for now – having one limit for all ISO markets triggered off the real-time market, and allowing two-day rather than one-day response in the day-ahead and real-time markets – the loss of simplicity and predictability and the cost to implement can be kept at a low level. For these reasons the DMA finds Option 2 to be the preferable approach.

MANAGEMENT RECOMMENDATION

Because we have not obtained a FERC order granting or denying our extension request, this is a matter on which the Board must act if we do not want to risk expiration of all price limiting authority November 15. Although the Board voted in June (upon Management's recommendation) to implement a Price Volatility Limit Mechanism (PVLM), we cannot do so without agreement on a substantial number of open details. Both the ISO and market participants have invested substantial time and effort on this matter. In light of this substantial stakeholder input, we have concluded that return to a simpler fixed price cap approach is preferable. Specifically, we recommend:

- **Option 1. Fixed price caps increasing in two steps.** This option would continue the current $250 caps until the later of shake-out of the redesign software or September 30, consistent with the Board's June 1999 resolution. The caps would then increase to $500 and maintain that level to allow the ISO to observe market performance through the fall and winter months. On June 1, assuming pre-dispatch and netting out of Reliability Must-Run (RMR) energy have been implemented (or in any event if FERC has rejected those proposals), the caps would increase to $1000 for the summer 2000 peak season.

We see the value of gathering information, a point raised by Market Analysis. But we do not believe on balance that the value of gathering information supports implementation of PVLM over the simple price cap approach. When we recommended the PVLM approach, we believed it presented a more palatable mechanism to bridge the interim period between implementation of the redesign software and the end of a full summer of experience under redesign. The substantial input from stakeholders and internal analysis since then convince us that on balance a simple staged price cap approach is preferable because it (1) is the simplest and least expensive to implement and (2) makes it clear to the market that the limits are temporary in nature. Our recommendation is conditioned, however, on a "safety net" provision that authorizes fast action by the ISO to lower price caps in the event of a market crisis, with follow-up notification and analysis to be presented to the Board.