



## Memo

To: Market Issues/ADR Committee  
From: Susan Schneider, Vice President, Client Services  
Kellan Fluckiger, Vice President, Operations  
CC: ISO Board, ISO Executives  
Date: January 15, 1999  
Re: **STATUS REPORT ON MARKET REDESIGN PROCESS**

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**Note to Market Issues/ADR Committee:** *The Market Surveillance Committee met on January 15, and discussed the Management recommendations presented in this memo. The only element of the proposed market redesign plan of concern to the MSC is that relating to auction design changes. In particular, the MSC believes that the product-specific simultaneous auction, proposed for implementation after this Summer, is a "step backward". Management is reevaluating its recommendations in light of the MSC comments, and will provide additional information and analysis for the Committee's consideration at the January 21 meeting.*

### EXECUTIVE SUMMARY

#### Introduction

The purpose of this memo is to present for the Committee's consideration a summary of the proposed elements of the Ancillary Services (A/S) market redesign plan which must be filed with FERC on March 1, 1999. The objective of the plan is to establish workably competitive markets and reduce the opportunities and incentives to exercise market power. FERC ordered the ISO to work with stakeholders and file a plan which addresses structural deficiencies in the Ancillary Services markets, including those identified by the Market Surveillance Committee (MSC).

Tariff language addressing two of the deficiencies identified by the MSC was approved by the ISO Governing Board in November and filed in Amendment No. 13 to the ISO Tariff. The actions taken by the Board addressed these deficiencies:

- 1) **Incentives to under-schedule load and avoid Ancillary Services costs:** Bill Ancillary Services based on metered Demand.

- 2) ***Incentives to use committed Ancillary Services capacity for uninstructed deviations:*** Eliminate capacity and Energy payments for obligated Ancillary Services capacity used for uninstructed deviations (the “no pay” proposal).

We believe that the A/S Redesign elements proposed in this memo as a package constitute an effective redesign of the ISO A/S markets and will substantially improve the workings of the A/S procurement process. We also believe that all major interdependent market impacts have been considered.

### **Summary of Requested Committee and Board Action**

Management requests that the Market Issues Committee recommend to the Board the actions listed below, in preparation for the March 1 filing. (*Note that all the high-priority redesign items below are described in further detail in Appendix 8.*)

- **Approve the proposed definition of the A/S market problems and the criteria for evaluating potential solutions**, as developed in cooperation with Market Participants and described in subsequent sections of this memo.
- **Classify the following elements as most critical for implementation this summer (Priority 1a)**, with tariff language to be brought before the Board in February and included in the March 1 filing for FERC approval:
  1. ***Auction design changes:*** Use existing software to implement the so-called “rational buyer” approach, where the ISO would substitute additional purchases of higher quality A/S for lower quality A/S (e.g., Spinning Reserve for Non-Spinning Reserve), when that would reduce total A/S costs. In the fall, replace this method with new software implementing a simultaneous auction method to replace the existing sequential method.
  2. ***Uninstructed deviations compromise and use of Replacement Reserve:*** Purchase additional Replacement Reserve for the shortfalls in scheduled load, plus implement a compromise proposal to reduce out-of-market activity and reduce incentives for uninstructed deviations that reduce the reliability of the BEEP stack. This compromise replaces the earlier “Min-Max” proposal.
  3. ***Automation of BEEP instructions:*** Implement software to send energy dispatch communications electronically, rather than by phone, to increase supplies by reducing the incidence of “skipped bids” and allow fuller use of the BEEP stack, thus reducing the need for out-of-market and out-of-sequence activities.
  4. ***Separate pricing of “Regulation up” and “Regulation down” services:*** While these requirements are now specified and procured separately, the “scarcer” service sets high clearing prices for both. Aside from saving a large amount of money, software to allow separate pricing will remove gaming/market-power opportunities as well. Depending on the future ability of the ISO to follow load, either with improved BEEP performance or a ramp

or load following product, the ISO may in the future re-combine upward and downward Regulation.

5. **Completion of the Participating Load Agreement:** This counterpart to the Participating Generator Agreement would facilitate participation of dispatchable loads in the A/S markets, increasing the ability of loads to avoid high market prices.
6. **Implementation of Inter-SC trades for A/S:** Implement software to allow bilateral A/S trades to encourage self-provision, an alternative to purchases from the ISO's A/S markets. A more vigorous self-provision market could allow Market Participants to expand opportunities by making their own deals.

**Management believes that implementation of the first four items are necessary and, in combination with satisfactory resolution of pending Reliability Must-Run (RMR) unit issues, may be sufficient to reduce the opportunity and incentives for generators to exercise market power, such that the Board could raise A/S price caps to be equal to the previously identified interim BEEP cap of \$750/MWh.**

As further protection to the market if and when price caps are raised, Management intends to recommend to this Committee in February a "safety net." This safety net would include indicators of significant market power or other market distortions based on observed prices and price fluctuations relative to demand and congestion conditions, along with specific actions that could be taken when such indicators suggest the exercise of market power. This safety net will be proposed for inclusion in the March 1, 1999 filing.

The Participating Load Agreement is included because it has the potential to increase A/S supplies, has been requested by Market Participants interested in exploring it as a tool to increase price responsiveness for loads, and can be finalized without additional ISO software development.

The sixth item dealing with Inter-SC Trades of A/S is of highest importance to many Market Participants involved in the ISO's stakeholder process, and the ISO would like very much to implement this measure before next summer. Unfortunately, due to the software requirements to implement the first four items above, along with other high-priority work such as Year 2000 activities, it does not appear at this time that there are sufficient software resources to do so.

However, potential efficiencies in the work on the first four items, as well as in the ISO's other higher-priority work (e.g., Year 2000 testing) may possibly allow for implementation of the sixth item by next summer, or soon after. Therefore, Management recommends including tariff language and other implementation details for this item in the FERC filing. The ISO will make every reasonable effort to implement this modification as soon as the other items above have been addressed.

- **Designate the other items listed below also as high priority (Priority 1b).** In Management's opinion, they are not as critical as the items listed above, though the first item in particular was supported by the majority of participants in the stakeholder process for implementation as soon as possible. If the Board agrees with Management's assessment of priorities, however, these other items cannot be implemented this summer, considering the ISO's other high-priority work. The March 1 filing will include descriptive information about these items, and state the ISO's intention to proceed with them next year (with tariff language and product design to be included in a later filing).
  1. ***Preserve firmness of Imports:*** Implement new software to preserve the firmness of imports in inter-SC trades and allow credit for firm imports when A/S are procured zonally. This would increase the competitiveness of A/S imports, particularly in conjunction with the implementation of the FTR program. (Note that this problem can be solved, in part, through Inter-SC Trades of A/S).
  2. ***Provide the ability to bid and self-provide the same A/S from the same unit:*** Currently, SCs can bid and self-provide A/S from the same *unit*, but the bid and self-provision must be of different *services*. New software would remove that limitation.
  
- **Prioritize the other important A/S redesign work identified through the ISO's stakeholder process ( Priority 2 and 3 items listed in Appendix 6 ) as less critical than the above elements.** These items should be described generally in the FERC filing, and they would be formally prioritized and scheduled later based on their relative importance to other work, as determined by the Board.

A policy decision is necessary in January so that the ISO, in cooperation with Market Participants, can proceed with preparing tariff language and other necessary elements for the March 1 filing.

## **BACKGROUND**

Although the ISO became operational less than ten months ago, several significant events have occurred to transform the environment in which the ISO operates its Ancillary Services markets. For your convenience, these events are briefly described in Appendix 1.

Of particular importance was the report issued by the Market Surveillance Committee (MSC) in August, 1998. FERC requested this report in light of significant concerns regarding market power in the Energy and Ancillary Services markets. Specific structural deficiencies identified by the MSC and Market Participants are described in more detail in Appendix 2.

In commenting on the MSC report, the ISO proposed that it be allowed to continue working with stakeholders to integrate the results of ongoing stakeholder discussions with the ISO's response to the MSC report. FERC concurred, noting that its "ultimate goal is to eliminate all reliance on price caps", and directed the ISO to facilitate a comprehensive stakeholder process to develop structural solutions to the market design problems identified by the MSC, and any other market design problems identified in the stakeholder process.

## ISSUES AND EVALUATION CRITERIA

The ISO'S A/S markets are not yet workably competitive. Prices in these markets do not fluctuate in a manner consistent with changes in the underlying marginal costs of supplying these services. The Ancillary Services markets have also exhibited excessive price volatility, and prices for "lower quality" services such as Replacement Reserve have often exceeded prices for higher quality services such as Regulation. These conditions led to the imposition of price caps last summer and have prevented the ISO from lifting them in the time since.

The underlying problems causing the markets to operate inefficiently are related to several structural deficiencies. Those deficiencies, as identified by the MSC, the ISO, and Market Participants, can be grouped into three general categories:

- 1) *Demand for Ancillary Services is too high*: The ISO requires high levels of various Ancillary Services, particularly Regulation, compared to WSCC requirements and past operating practices. This high demand directly increases generator market power and raises the cost of Ancillary Services.
- 2) *Available Supply of Ancillary Services is too small*: Bids have often been insufficient to meet the ISO's needs. An effective market design encourages the presence of supplies from a significant number of independent suppliers, in excess of demands for Ancillary Services. Management believes that much of the time this shortfall is due to defects in market design rather than genuine supply scarcity.
- 3) *Existing Markets are inefficient*: An effective market design transmits accurate price signals between purchasers and sellers, so that Market Participants recognize the costs and benefits to the market as a whole of their actions, resulting in equilibration of prices across Energy and Ancillary Services markets.

Elimination of these three problems would directly limit both the potential for and harm from the exercise of market power, and it would result in conditions of workable competition.<sup>1</sup>

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<sup>1</sup> A map of how the structural deficiencies identified by the MSC are addressed in the ISO's proposed market redesign plan is provided in Appendix 3.

## Evaluation Criteria

A significant focus of the stakeholder process in support of A/S market redesign has been the identification, discussion, and refinement of suitable evaluation criteria to apply to each proposed element. A set of comprehensive evaluation criteria developed through that process is presented in Appendix 5. Those criteria were used to assign relative priorities to the options considered.

To evaluate the alternatives considered, Management used two key criteria:

- 1) How well does each option contribute to resolving the three principal issues (supply, demand, and market efficiency)? This criterion essentially consolidates the comprehensive criteria developed with Market Participants.
- 2) Which options does Management believe are necessary to raise price caps? FERC has acknowledged that price caps may bias market choices and inhibit investment if they are set too low, and therefore expects that the market redesign plan will ultimately allow the elimination of price caps. ***Elimination of the need for price caps, and lifting the price caps to \$750/MW in the interim, is the best single indicator of the ISO's success in establishing workably competitive markets.***

Management does not believe that any single action will create markets that are sufficiently competitive to support a decision to raise price caps. This second criterion was therefore considered in assessing the overall prioritization of the elements of the market redesign plan.<sup>2</sup>

## **KEY ASSUMPTIONS ABOUT ISO WORK PRIORITIZATION**

The recommendations presented in this memo are based on several assumptions regarding the relative priorities of various ongoing and upcoming software changes. The assumed priorities, in order, include:

- 1) ***Activities related to Year 2000***, including updating the UNIX operating system and retesting all existing applications.
- 2) ***“Priority 0” A/S Redesign projects previously approved by the Governing Board***, including billing Ancillary Services based on metered Demand and “no pay” for uninstructed deviations on Ancillary Services capacity.
- 3) ***“Priority 1a” market redesign actions critical for Summer 1999 and necessary to recommend raising price caps***, including the four highest priority market redesign measures (auction design changes, uninstructed deviations compromise and use of Replacement Reserve, automation of BEEP instructions, and separate pricing of Regulation up and Regulation down services).

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<sup>2</sup> While the measures included in Management's recommendation are believed to be necessary to raise caps, they will be insufficient if no RMR settlement is reached.

- 4) ***TO Debit solution and FTRs***, already approved and well underway.
- 5) ***“Priority 1a” market redesign action to be completed for Summer 1999 if possible***, i.e., Inter-SC Trades of Ancillary Services.
- 6) ***“Priority 1b” market redesign actions to be completed as soon as possible next year***, i.e., changes to retain firmness of imports and allow bidding and self-providing for the same service from the same unit.
- 7) ***Other important activities where software development is not yet underway***, e.g., other planned Phase 2 activities, software changes to implement the RMR settlement, GMC unbundling, settlement improvements, “Priority 2” and “Priority 3” A/S redesign elements, and other initiatives.

## **STAKEHOLDER PROCESS**

The ISO has worked to closely involve stakeholders in the development of the market redesign plan. That stakeholder process has been essential in developing the framework for a comprehensive market redesign plan, as described in more detail in Appendix 4.

## **OPTION SCREENING AND RANKING**

Over 30 Ancillary Services topics were originally identified, and were reviewed with Market Participants. A listing of those original topics, and their disposition relative to the draft comprehensive plan, is provided in Appendix 6.

These 30 plus options were reorganized and combined where appropriate, and on December 14 were discussed with Market Participants, who worked with the ISO to assign priorities to the consolidated options. The results of that effort are illustrated in Appendix 4, and additional details of the option screening process are presented in Appendix 7.

## **Positions of the Parties**

Using the evaluation criteria described above, the ISO and the Market Participants identified seven highest priority elements for the A/S redesign effort, all of which require software changes.<sup>3</sup> Recognizing that not all seven elements can be implemented before Summer 1999, the ISO asked Market Participants to identify those three measures which each considered to be highest priority for implementation. The following presents the results of that poll:

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<sup>3</sup> Another of the highest priority measures, element 21 – Demand participation and aggregation through the Participating Load Agreement, does not require software, and is proposed as a “Priority 1a” element of the market redesign plan.

Views of the Stakeholders  
(MIF 1/6/99 meeting and follow-up comments)  
January 12, 1999

Proposed Market Redesign Element	Organizations Listing the Element in their own “Top 3”
7/12a – Inter SC Trades of Ancillary Services	WPTF, APX, Williams, NCPA, PGE, BPA Power, DWR, PG&E Energy Services, US Gen, Sempra, LADWP, Citizens, LG&E, Southern Company, Enron, Dynegy, Duke, Houston Industries, MWD, Univ. of Calif., WAPA
7/12 b and c – Preservation of Firmness of imports on inter SC trades and Credit for Firm imports and hydro hen A/S procured by zone	Williams, WPTF, NCPA, BPA Power, US Gen, Sempra, Riverside, LADWP, Citizens, PGE, Enron, Dynegy, Duke, Houston Industries
13 – Ability to Bid and self-provide the same service from same unit in the same hour	Dynegy, Univ. of California, TID
<b><i>15 – The “rational buyer” approach – A demand substitution approach although a product specific simultaneous auction may be considered later</i></b>	SCE, Williams, PX, TURN, UCAN, DWR, MWD, SDG&E, CPUC
<b><i>16/31 and 2 – Use of replacement reserves and proper cost recovery together with the compromise proposal for uninstructed deviations (replacing min-max</i></b>	PGE, BPA Power, Southern Company, NCPA, PX, TURN, UCAN, PG&E
<b><i>5/17 – Automated BEEP</i></b>	SCE, WPTF, Calpine, DWR, PG&E Energy Services ,US Gen, Sempra, LG&E, PG&E, Southern Company, Enron, Duke, MWD, SDG&E, Houston Industries
<b><i>26 – Reg up/Reg down priced separately</i></b>	PX, Calpine, SCE, TURN, UCAN, PG&E Energy Services, PG&E, SDG&E

Note: Management believes the elements listed in ***bold italics*** are collectively necessary to raise price caps.



## **Other Comments by the Stakeholders**

Stakeholder inputs, through the “chat-room” tool and the various meetings and conference calls, have been extensive. The ISO has attempted to incorporate these concerns into the redesign elements to satisfy stakeholder concerns. However, as is apparent from the summary, the prioritization reached with the stakeholders was not unanimous. The following summarizes some key stakeholder concerns that are either not a part of the final prioritization or not included in the Management recommendation.

- LADWP and BPA both expressed concerns that their highest-priority issues are not in the final high priority listing. These two issues are the limits on A/S imports (currently 25% for Operating Reserve) and the risks associated with the forced HA buyback of A/S in the event of line derating or curtailments. (Note: This will be addressed as a high priority item after completion of the P1 items.)
- Support for A/S Trades and Firmness of Imports was widespread, and as noted earlier, gained the most votes from the participants. Some key comments:
  - WPTF: “This change (A/S trades) would have, by far, the most important impact on the market, and relieve the need for many of the other re-design items.....To facilitate a robust market, the ultimate buyers and sellers must be able to freely interact. To facilitate ongoing, forward trading of A/S capacity, SC’s must be allowed to engage in physical trading of A/S capacity.
  - NCPA: “Our ESP customers contract with marketers for power supply, and those marketers frequently want the flexibility to provide power from both out of the area and from in area. Unfortunately, those two alternatives are not equivalent with regard to operating reserves, hence our desire to preserve the firmness of SC to SC trades.”
  - “Second, NCPA is moving towards representing its own power plants to the ISO, instead of PG&E. The ISO will benefit from having new sources of reserves. When that happens, we will be doing a high volume of SC to SC trades between NCPA (SC) representing our plants, and PG&E (SC) still representing the NCPA load. The ability to have Ancillary Services on SC to SC trades, and the ability to preserve the firmness of SC to SC trades is therefore important to us.”
- Some participants, including the WPTF and a board member who has participated in the process, are concerned that the ISO still doesn’t allow A/S to compete with Energy for transmission capacity. They believe that this should be a higher priority. (Element 8, involving CONG/ASM integration, which was given a priority 2, would address this topic)
- SCE objects to the design element “Use of Replacement Reserve and Proper Cost Recovery”. Some key points are summarized below:

- It is disruptive to the fundamental design principals of California's Day Ahead, Hour Ahead, and Real-Time energy markets.
- It improperly utilizes A/S for the intended purpose of energy delivery.
- It increases demand, potentially dramatically, for Ancillary Services from a market that has been plagued by insufficient bids and structural flaws.
- It discriminates against load by penalizing purchasing flexibility without symmetrically penalizing generation. (Generation can participate in all markets while load is penalized for participating in anything but the DA energy market).

The ISO will respond to these concerns at the Market Issues Committee meeting on January 21.

### **Evaluation of Options using Proposed Criteria**

These results indicate that while there is significant support for all four elements which Management believes are necessary to raise caps, only Element 5/17 – Automated BEEP is also among the “top 3” measures identified by stakeholders as a whole. The three top priorities to stakeholders, based on the number of organizations indicating their support, were:

- 1) Inter-SC Trades of A/S
- 2) Preservation of firmness of imports, and
- 3) Automated BEEP

However, this analysis does not give a complete picture of the results. It is worth noting that many large organizations that primarily represent loads (PX, the IOUs, TURN/UCAN) have priorities more aligned with Management's recommendations.

The following explains why each measure is included in (or excluded from) the list of measures Management believes are necessary to raise price caps.

Element 7/12a – Inter-SC Trades of A/S – Several Market Participants consider lack of the ability to trade Ancillary Services to be the most significant deficiency in the present market design. ISO Management agrees that, in the long run, trades of Ancillary Services will encourage self-provision, and potentially create significant opportunities for bilateral transactions. Bilateral transactions would reduce the impact of deficiencies in the ISO's markets by both shrinking the size of those markets and providing a means for Market Participants to satisfy their needs elsewhere. Recognizing these benefits, and because of the high priority accorded this element by Market Participants, Management proposes that this item be included in the “Priority 1a” category for

completion by Summer 1999 if possible. The only new initiatives with higher priority are the four measures that Management believes are necessary to lift price caps.

However, even if this modification were available for the summer, SCs representing the great majority of loads in the market could not participate in Inter-SC Trades of A/S, so the overall market impact would be small. Therefore, based on these considerations, Management does not believe that the availability of software to support trades of A/S is necessary to raise price caps. However, Management remains optimistic that Inter-SC trades of A/S will be available in 1999, with possible implementation during or slightly after Summer 1999.

Element 7/12 b and c – Preservation of Operating Reserve Credits – This item also has strong support, principally from Energy traders and representatives of System Resources. The ISO believes that failing to provide proper credit for Operating Reserve introduces an undesirable bias into market decisions, causing transactions involving firm imports to the ISO Control Area to be relatively less desirable. When the ISO procures zonally, these limitations also cause an overstatement of Operating Reserve requirements on hydroelectric resources used to serve load in another zone.

The ISO places a high priority on resolving the software limitations that cause these problems, which cause the ISO to slightly over-state A/S requirements. When these corrections are made, the ISO's demand for A/S will be slightly reduced, and the supply of A/S will be slightly improved to the extent that firm imports become more competitive as a result of proper crediting for Operating Reserve.

Despite these benefits, Management does not believe that these measures should be included in the "Priority 1a" category for the following reasons. First, the problems can be, in part, mitigated through use of Inter-SC Trades of A/S. For example, an SC using a firm import to supply an Inter-SC Trade of Energy may concurrently enter an Inter-SC Trade for the A/S obligation its trading partner will accrue on the Load served by the Energy trade. Second, while there are clear benefits to this element, Management does not believe that those benefits are sufficient to justify substitution of this action for any of the measures identified as "Priority 1a".

Element 13 – Bid and Self-Provide the Same Service from the Same Unit in the Same Hour – This measure is only among the top 3 items for three Market Participants. Ultimately, Management believes that it is important to provide complete flexibility between ISO A/S market participation and self-provision, and this measure is therefore included in the market redesign plan.

However, the limitations imposed by the present market design are very narrow. To illustrate, a Scheduling Coordinator may today use a single Generating Unit to bid Regulation and Spinning Reserve, while self-providing Non-Spinning Reserve and Replacement Reserve from the same unit, all in the same hour. The only existing limitation is that bidding and self-providing the same service, such as Regulation, from the same unit in the same hour cannot be accommodated.

While providing more flexibility between bidding and self-provision, this measure would not increase the total supply of A/S available to meet ISO Control Area requirements, or reduce the total A/S required. For these reasons, Management does not designate this element as “Priority 1a”.

Element 15 – Auction Design Changes (Rational Buyer/Simultaneous Auction) – This measure specifically addresses a structural deficiency identified by the Market Surveillance Committee, and it has received strong support from several Market Participants, particularly those representing load. This measure will allow the ISO to rationally procure A/S by substituting a higher value service for a lower value service if the effect of such substitutions is to lower the total cost of A/S.

This measure also encourages bidding behavior that is consistent with a competitive market by eliminating the opportunity to game the sequential auction and earn a high price for Replacement Reserve, the last service procured. This measure will therefore reduce the overall cost of Ancillary Services, and in particular will reduce the risk of price spikes of the nature observed last summer. For these reasons, Management believes this measure is necessary to raise price caps.

Element 2/16/31 – Uninstructed Deviations Compromise and use of Replacement Reserve – This measure is the ISO’s proposed compromise solution to the problem of uninstructed deviations, and it is supported by several Market Participants who represent load.<sup>4</sup> Although this measure would not directly address uninstructed deviations by resources without bids, it would eliminate a potential gaming incentive that pays a resource which with an accepted bid to ignore an instruction. Further, it assures that during periods in which the ISO forecasts under-scheduling of load, the ISO will procure more Replacement Reserve rather than relying on out-of-market purchases of blocks of Energy. The cost of such Replacement Reserve will be properly assigned to those who under-scheduled.

The additional Replacement Reserve will be subject to the “no pay” proposal approved by the Governing Board in November, and will therefore have a strong incentive to be available and capable of being dispatched. Capacity that would otherwise elect to not submit A/S or Supplemental Energy bids, and then deviate without instruction, may have an increased incentive to participate in the Replacement Reserve market. This should help improve the quality of the BEEP stack and may reduce the amount of uninstructed deviations by resources without bids.

Although this measure may increase the ISO’s demand for Replacement Reserve, it greatly reduces the possibility that the ISO will go outside the A/S and Supplemental Energy markets. This will eliminate the incentive for potential A/S supplies outside the ISO Control Area to withhold capacity in anticipation of a negotiated price for out-of-market purchases.

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<sup>4</sup> The problem of uninstructed deviations, and Management’s proposed compromise solution, will be addressed in a separate memo to the Market Issues Committee for consideration at the January 28 meeting.

In summary, this measure should increase market participation and may reduce the magnitude of problems caused by uninstructed deviations. Based on these considerations, Management believes this element is necessary to raise the price caps and is included as Priority 1a.

Element 5/17 – Automated BEEP – Management and Market Participants concur that this element should be among the “top 3” actions included in the market redesign plan. This element will increase the speed and accuracy of dispatch instructions to resources in the BEEP stack, thereby reducing the number of errors and disputes regarding the content or timing of dispatch instructions, and reducing the need to skip bids, or dispatch resources out of sequence. This will allow the Generation Dispatchers to dispatch more of the Energy in the BEEP stack, including small resources.

As a result of these improvements, BEEP Interval Prices will be more accurate and reflective of the marginal price of balancing Energy, making the Hourly Ex Post Price more accurate. The risk of a resource not being called when the market price reaches a its bid price is reduced.

The net effect of these changes would be to reduce the ISO’s demand for A/S, particularly Regulation, and to increase incentives to submit bids. This would encourage equilibration between the Energy and Ancillary Services markets. For these reasons, Management includes this measure with those necessary to raise price caps.

Element 26 – Reg Up / Reg Down Priced Separately – Market Participants representing load generally support this measure, which provides two significant benefits. First, it reduces the cost of Regulation by eliminating over-payments to suppliers of whichever service (Reg Up or Reg Down) would have cleared at a lower price. Second, it eliminates any incentive to game the Regulation market by bidding for market share at a very low (or negative) price in one market, while bidding very few or no MW in the other market in hopes that a positive market clearing price will be set in that other market. Based on these reasons, Management recommends that this measure be included in “Priority 1a”.

## **APPENDIX 1 EARLY CHANGES AFFECTING ISO MARKETS**

Since initiating operations on March 31, 1998, the ISO has conducted auctions for Regulation, Spinning Reserve, Non-Spinning Reserve and Replacement Reserve in the Day Ahead and Hour Ahead Markets. The requirement for each Ancillary Service was initially based on the aggregate load scheduled by Scheduling Coordinators in each market. No FERC jurisdictional Market Participant had authority to sell Ancillary Services at market-based rates, and price caps were unnecessary since essentially all bidders were subject to FERC-approved cost-based rate caps.

Soon after beginning operations, the ISO became concerned about the insufficient number of bids, or “thinness” of Ancillary Services Markets. The ISO experienced particularly significant deficiencies in the volume of Regulation bids, which met less than 40 percent of the ISO’s requirements in the first few weeks of operation, resulting in high economic costs, and causing significant concerns regarding system reliability.

The ISO determined that the lack of bids was a result of cost-based rate caps on Regulation capacity, together with the method used to price Energy from units on Regulation. The ISO addressed the Energy pricing problem through a proposed interim solution called the “Regulation Energy Payment Adjustment” or REPA. REPA was implemented on May 21, 1998, and resulted in a significant improvement in the sufficiency of Regulation bids.

Through the first three months of operation, no Market Participant had authority to sell Ancillary Services at market-based rates. With orders issued on June 30 and July 10, the competitive landscape was changed significantly, as certain active Market Participants were granted authority to sell Ancillary Services at market-based rates, and all Market Participants were granted market-based rate authority for Replacement Reserve, which FERC determined was not an Ancillary Service. Dramatic price spikes were observed in the first half of July, particularly for Replacement Reserve, as this market-based rate authority was initially tested.

These significant price spikes led the ISO to place an initial cap of \$500/MW on Ancillary Services bids, which the ISO subsequently lowered to \$250/MW. In granting the ISO authority to impose price caps, FERC concluded that additional fact finding regarding the nature of the structural deficiencies in the Ancillary Services markets was necessary, and directed the Market Surveillance Committee (MSC) to conduct an independent study. Before the MSC filed its study, FERC issued two additional orders granting market based rate authority to other Market Participants.

The MSC filed its report to FERC on August 19, 1998, and noted several structural deficiencies that caused the Ancillary Services markets to be less competitive than the available markets for Energy. The ISO and other parties provided comments on the MSC report, and the ISO submitted a work plan and subsequent status report that addressed several of the MSC recommendations. In its comments, the ISO proposed

that it be allowed to continue working with stakeholders to integrate the results of that stakeholder initiative with the responses to the MSC report.

One of the principal conclusions of the MSC report was that the Ancillary Services markets were less competitive because some suppliers have market-based rate authority, while others are subject to cost-based caps. In an order issued October 28, 1998, FERC addressed that deficiency by issuing blanket authority for market-based rates.

In the same order, FERC extended the interim authority of the ISO to establish Ancillary Services price caps. In noting that its “ultimate goal is to eliminate all reliance on price caps”, FERC also directed the ISO to facilitate a comprehensive, stakeholder process to develop structural solutions to the market design problems identified by the MSC, and any other market design problems identified in the stakeholder process.

With the extension of market-based rate authority available to all owners of generation, the cost-based caps on Regulation were no longer a factor, and the need for REPA was diminished. The market clearing prices for Regulation dropped to zero during most hours, and the ISO Governing Board responded by suspending REPA following the lifting of cost-based rate caps in November 1998.

For the first several months of ISO operation, the Ancillary Services were procured based on schedules. In recognition that schedules did not necessarily provide a good forecast of the load for which the ISO would need to carry Operating Reserve in real time, the ISO began procuring Ancillary Services based on the ISO load forecast in the fall of 1998. Several software changes have also been made since the ISO initiated operations to improve the efficiency of the ISO’s markets.

## APPENDIX 2 STRUCTURAL DEFICIENCIES

The following discusses the problems and other structural deficiencies identified by the Market Surveillance Committee and Market Participants in the stakeholder review process.

### **Identified by the MSC:**

The MSC concluded that if there were little or no market power in the PX or Imbalance Energy markets, then little or no market power would be expected in the A/S markets. Several structural factors that limit competition have caused the A/S markets to be less competitive than the energy markets. Those factors include:

- 1) Some firms are subject to cost-based price caps while others have market-based rate authority.
- 2) Demand for A/S is higher than anticipated.
- 3) The amount of each A/S the ISO procures does not vary in response to price, and the ISO has limited ability to substitute between services.
- 4) Pricing in RMR agreements create perverse incentives for bidding into the A/S market.
- 5) Zonal procurement of A/S increases potential for market power, and a statewide auction should be used.
- 6) Dispatch practices are not transparent.
- 7) A/S cost allocation based on schedules creates incentive to under-schedule.
- 8) Suppliers from outside the control area are excluded from supplying A/S.
- 9) Software limitations have exacerbated these problems.

FERC addressed the MSC's concern regarding cost-based price caps by issuing blanket authority for market-based rates. The ISO does not concur with the MSC regarding the structure of the RMR Agreements, or on the use of a statewide auction for Ancillary Services. With the exception of those issues, the ISO is committed to addressing the deficiencies identified by the MSC.

Two of the deficiencies identified by the MSC are being addressed by actions approved by the ISO Governing Board in November. The tariff changes necessary to address these deficiencies were filed in Amendment No. 13 to the ISO Tariff. Those deficiencies include:

- 1) The incentive to under-schedule and avoid Ancillary Services costs is solved by the proposal to bill Ancillary Services based on metered Demand.
- 2) One of the software deficiencies noted by the MSC was that resources awarded Ancillary Services capacity often used that capacity for uninstructed deviations. This issue is addressed by the proposal to eliminate capacity and Energy payments for obligated Ancillary Services capacity used for uninstructed deviations (the "no pay" proposal).



These two measures will be implemented before Summer, 1999.

**Identified by Market Participants:**

Market Participants agree with several of the deficiencies identified by the MSC, but certain problems important to many Market Participants were not addressed by the MSC. The ISO has sought to understand and integrate these additional concerns which included the following:

- 1) Lack of an ability to engage in trades of Ancillary Services limits opportunities of Scheduling Coordinators to take full advantage of bilateral arrangements that would increase reliance on self-provision.
- 2) Operating Reserve credits for firm imports are lost on Inter-SC Trades of Energy.
- 3) Operating Reserve credits for firm imports are lost when Energy within a Scheduling Coordinator's portfolio is delivered across a zonal interface if the ISO procures zonally, or if there is congestion.

**Identified through other forums:**

The ISO has separately undertaken a series of "roundtable" meetings with the generator owners and other interested parties to identify concerns with ISO systems and procedures, and to make necessary improvements. Issues of particular concern include the way in which dispatch instructions are communicated, and the ISO's reliance on out-of-market calls. The ISO believes that these and other concerns of the generator owners are addressed in the proposed comprehensive plan.

Other issues have been raised in the undresolved issues proceeding before FERC. Where possible, the ISO has worked to integrate those comments and concerns relevant to Ancillary Services markets into the measures considered in developing the proposed comprehensive plan. Examples of such issues include rational procurement of Ancillary Services, preservation of "firmness" of imports, criteria for procurement of Replacement Reserve, use of interruptible exports for Ancillary Services, and competitive procurement of Voltage Support.

### APPENDIX 3

<b>COMPARISON OF THE STRUCTURAL DEFICIENCIES IDENTIFIED BY MSC TO THE RESULTS OF APPLYING A/S REDESIGN EVALUATION CRITERIA</b>	
<b>Structural Deficiencies Identified in MSC Report<sup>5</sup></b>	<b>Ancillary Services Redesign Elements Addressing Structural Deficiencies<sup>6</sup></b>
<b>(A) Improvements that reduce the ISO demand for Ancillary Services.</b>	
Section 4.2 Demand for Ancillary Services is Higher than Anticipated	<ul style="list-style-type: none"> <li>• Multiple ramp-rates [3]</li> <li>• Automated BEEP [5/17]</li> <li>• Ramping requirement / Load following [6/18]</li> </ul>
Section 4.9 Other Software Difficulties:	
<ol style="list-style-type: none"> <li>1. Inability of BEEP to track operator dispatch instructions.</li> <li>2. Mishandling of downward regulation in sequential A/S evaluation</li> <li>3. Inadequate verification of eligibility of A/S bids</li> <li>4. Lack of coordination between Congestion Mgmt and A/S Mgmt software</li> <li>5. Settling A/S responsibility based on scheduled rather than actual load</li> </ol>	<ol style="list-style-type: none"> <li>1. BEEP modifications and standardization of dispatch instructions for consistency (done); automated BEEP instructions and acknowledgements [5/17] (planned in A/S Redesign process)</li> <li>2. Downward regulation capacity not subtracted in sequential process (done)</li> <li>3. Additional SI validation (done); first phase of A/S certifications for Pmax, ramp rates and Master File updates (done); multiple ramp rates [3] (planned in A/S Redesign process)</li> <li>4. A/S Mgmt takes into account updated Master File resource limits and the results of Congestion Mgmt (done); CONG/ASM Integration [8, and as relates to 11, 12, 14 and 28] (planned in A/S Redesign process)</li> <li>5. Billing based on metered demand (approved by ISO Board for 1999 implementation)</li> </ol>

<sup>5</sup> "Preliminary Report on the Operation of the Ancillary Services Markets of the California Independent System Operator (ISO); prepared by the MSC of the CAISO; August 1998.

<sup>6</sup> Bracketed "[ ]" numbers refer to specific elements of Ancillary Services Redesign process

**COMPARISON OF THE STRUCTURAL DEFICIENCIES IDENTIFIED BY MSC  
TO THE RESULTS OF APPLYING A/S REDESIGN EVALUATION CRITERIA**

Structural Deficiencies Identified in MSC Report <sup>5</sup>	Ancillary Services Redesign Elements Addressing Structural Deficiencies <sup>6</sup>
<p>6. Improper settlement for Replacement Reserve</p> <p>7. Lack of proper coordination between ISO's dispatch and automatic control software</p> <p>8. Lack of 10-minute real-time price information</p> <p>9. Failure to track uninstructed deviations using reserved capacity</p> <p>10. Improper payment for uninstructed deviations</p> <p>11. Ignoring impact of A/S on Congestion</p> <p>12. Lack of explicit requirement for downward regulation</p>	<p>6. Tariff amendments to settle for A/S consistent with zonal procurement (done); proper use and settlement of RR, including elimination of cost-shifting in billing based on metered demand [16/31] (planned in A/S Redesign process)</p> <p>7. BEEP takes into account the actual output of resources (done)</p> <p>8. BEEP publishes 10-minute zonal Imbalance Energy prices to WEnet and the ISO Home Page (done)</p> <p>9. Tariff amendments to eliminate payments for reserved capacity and uninstructed energy, i.e., the "No Pay" amendments (approved by ISO Board for 1999 implementation)</p> <p>10. "Min/Max", and other proposals, discussed extensively in stakeholder process, with proposals planned for ISO Board Committee presentation in January 1999</p> <p>11. Integration of Congestion Mgmt and A/S Mgmt [8, and as relates to elements 11, 12, 14 and 28] (planned in A/S Redesign process)</p> <p>12. Separate requirements for RegUp and RegDn, with single price for Regulation capacity (done); separate requirements and separate Market Clearing Prices for RegUp and RegDn [26] (planned in A/S Redesign process)</p>
<b>(B) Improvements that increase the supply of Ancillary Services to the ISO.</b>	
<p>Section 4.1 Asymmetric Regulation of Suppliers</p>	<ul style="list-style-type: none"> <li>• FERC permits all suppliers to earn market-based rates for Ancillary Services (done)</li> </ul>
<p>Section 4.4 Perverse Incentives Created by Reliability Must-Run Contracts</p>	<ul style="list-style-type: none"> <li>• Standard form of RMR Contract currently being negotiated to remove perverse incentives</li> <li>• PTO versus SC obligation to pay for cost of energy required to create Spinning Reserves and Regulation during market deficiencies [32]</li> </ul>

**COMPARISON OF THE STRUCTURAL DEFICIENCIES IDENTIFIED BY MSC  
TO THE RESULTS OF APPLYING A/S REDESIGN EVALUATION CRITERIA**

Structural Deficiencies Identified in MSC Report <sup>5</sup>	Ancillary Services Redesign Elements Addressing Structural Deficiencies <sup>6</sup>
	(planned in A/S Redesign process) <ul style="list-style-type: none"> <li>• Ancillary Service procurement in real-time from market resources, instead of exclusively from RMR units [33] (planned in A/S Redesign process)</li> </ul>
Section 4.5 Zonal Purchases of Ancillary Services	<ul style="list-style-type: none"> <li>• ISO procedures clarified and distributed to stakeholders (done)</li> <li>• ISO Market Surveillance Unit is monitoring for any exercise of zonal market power (on-going)</li> </ul>
Section 4.6 Ambiguous Dispatch Practices for the Provision of Imbalance Energy	<ul style="list-style-type: none"> <li>• PWC Operational Audit follow-up, including additional training and improvements in the consistency of dispatch instructions and logging</li> <li>• BEEP modifications (planned for 1999 completion) and standardization of dispatch instructions for consistency (done); automated BEEP instructions and acknowledgements [5/17] (planned in A/S Redesign process)</li> <li>• BEEP takes into account the actual output of resources (done)</li> <li>• BEEP publishes 10-minute zonal Imbalance Energy prices to SC workspaces and the ISO Home Page (done)</li> <li>• Split BEEP stack such that energy from Spinning and Non-Spinning reserves are called only for contingencies [4] (planned in A/S Redesign process)</li> <li>• Tariff amendments to eliminate payments for reserved capacity and uninstructed energy, i.e., the "No Pay" amendments (planned) for second quarter 1999</li> <li>• "Min/Max", and other proposals, discussed extensively in stakeholder process, with proposals planned for ISO Board Committee presentation in January 1999</li> </ul>
Section 4.8	

**COMPARISON OF THE STRUCTURAL DEFICIENCIES IDENTIFIED BY MSC  
TO THE RESULTS OF APPLYING A/S REDESIGN EVALUATION CRITERIA**

Structural Deficiencies Identified in MSC Report <sup>5</sup>	Ancillary Services Redesign Elements Addressing Structural Deficiencies <sup>6</sup>
Exclusion of Suppliers from Outside of the ISO Control Area	<ul style="list-style-type: none"> <li>• A/S imports of Spin, Non-Spin and Replacement reserves (done)</li> <li>• Uninstructed deviations compromise and use of Replacement Reserve [2/16/31]</li> <li>• Imports of Regulation [11] (planned in A/S Redesign process)</li> <li>• Bid / Self-Provide from same unit in same Settlement Period [13] (planned in A/S Redesign process)</li> <li>• Non-firm exports for Non-Spinning and Replacement reserves [14] (planned in A/S Redesign process)</li> <li>• Hour-Ahead buy-back of Ancillary Services based on tie-line derates [27] (planned in A/S Redesign process)</li> <li>• CONG/ASM Integration [8, and as relates to 11, 12, 14 and 28] (planned in A/S Redesign process)</li> </ul>
Section 4.9 Other Software Difficulties	<ul style="list-style-type: none"> <li>• See items listed above regarding Section 4.9 "Other Software Difficulties"</li> <li>• Non-firm exports for Non-Spinning and Replacement reserves [14]</li> <li>• Demand participation and aggregation [21]</li> <li>• A/S procurement in real-time [33]</li> </ul>
(C) Improvements in the efficiency of the auction [and enhancement of bilateral markets].	
Section 4.3 Ancillary Services are not Procured Rationally	<ul style="list-style-type: none"> <li>• Tariff amendments to settle for A/S consistent with zonal procurement (done)</li> <li>• Rational buyer procurement of Ancillary Services [15] (planned in A/S Redesign process)</li> <li>• Reg Up and Reg Dn priced separately [26] (planned in A/S Redesign process)</li> </ul>
Section 4.6 Ambiguous Dispatch Practices for the Provision of Imbalance Energy	<ul style="list-style-type: none"> <li>• See items listed above regarding Section 4.6 "Ambiguous Dispatch Practices for the Provision of Imbalance Energy"</li> <li>• Proper use and settlement of RR, including elimination of cost-shifting in billing based on</li> </ul>

**COMPARISON OF THE STRUCTURAL DEFICIENCIES IDENTIFIED BY MSC  
TO THE RESULTS OF APPLYING A/S REDESIGN EVALUATION CRITERIA**

Structural Deficiencies Identified in MSC Report <sup>5</sup>	Ancillary Services Redesign Elements Addressing Structural Deficiencies <sup>6</sup>
	metered demand [16/31] (planned in A/S Redesign process)
<p>Section 4.7 Flawed Allocation of Ancillary Service Costs to Scheduling Coordinators</p>	<ul style="list-style-type: none"> <li>• Billing based on metered demand (approved by ISO Board for 1999 implementation)</li> <li>• Tariff amendments to settle for A/S consistent with zonal procurement (done)</li> <li>• Tariff amendments to eliminate payments for reserved capacity and uninstructed energy, i.e., the "No Pay" amendments (approved by ISO Board for 1999 implementation)</li> <li>• Ramping requirement / Load following [6/18] (planned in A/S Redesign process)</li> <li>• Proper use and settlement of RR, including elimination of cost-shifting in billing based on metered demand [16/31] (planned in A/S Redesign process)</li> </ul>
<p>Section 4.9 Other Software Difficulties</p>	<ul style="list-style-type: none"> <li>• See items listed above regarding Section 4.9 "Other Software Difficulties"</li> <li>• Inter-SC Trades of A/S [7/12]</li> <li>• Bid / Self-Provide from same unit in same Settlement Period [13]</li> </ul>

## APPENDIX 4 STAKEHOLDER PROCESS AND PRIORITIZATION OF OPTIONS

### Stakeholder Process Summary

A stakeholder process was launched in September, 1998. A working group was formed to identify potential projects to improve these A/S markets.

The stakeholder involvement was refocused and accelerated by the FERC order in October. The ISO led several stakeholder forums, including meetings and conference calls, leading to the prioritization and design elements presented here.

The cooperation and involvement by the stakeholders has been excellent, both in identification of potential solutions and the development of the details supporting those solutions. The stakeholders were also supportive in the ISO efforts to formalize their views on prioritization, amidst the fast pace and the complexity of some of the redesign elements. The key meetings at which Market Participants offered comments that have been constructively integrated into the ISO's development of a draft market redesign plan are identified below:

<b>Stakeholder Feedback On Market Redesign Issues Since October 28, 1998</b>		
Date	Forum	Topics
November 2, 1998	Generator Owner/Scheduling Coordinator Round Table	Concerns of resource owners regarding market design and operations
November 18, 1998	Market Redesign Meeting	Desired Features of A/S Markets; Developed list of 33 items
December 2, 1998	Generator Owner/Scheduling Coordinator Round Table	Mapping of concerns to ongoing processes and initiatives
December 4 to December 14, 1998	ISO Internet Discussion Page on Ancillary Services	Review and comment on ISO issue papers for 33 items
December 14, 1998	Market Redesign Meeting	Prioritization of Redesign Elements
December 18, 1998	Market Redesign Conference Call	1. Continue Prioritization of Redesign Elements 2. ISO proposal to solve Uninstructed Deviations
December 22, 1998	Solution to Uninstructed	Market Participant

<b>Stakeholder Feedback On Market Redesign Issues Since October 28, 1998</b>		
<b>Date</b>	<b>Forum</b>	<b>Topics</b>
	Deviations Conference Call	suggestions for solving uninstructed deviations
January 6, 1999	Market Issues Forum	Review schedule and cost estimates, refine priorities

To improve communications, the ISO implemented a “chat-room” forum accessible through the ISO Web Page. The redesign option descriptions were posted on the WEB for viewing by anyone. The chat room allowed stakeholders to express their views and recommendations on each option to the ISO. All comments were captured and viewable on the WEB, so that stakeholders could view and learn from the inputs of other stakeholders.

### **December 14 Stakeholder Meeting Prioritization**

Throughout the September – December timeframe, the problems with the Ancillary Services markets were more clearly defined in cooperation with the Market Participants. The ISO and the Market Participants identified 33 separate potential redesign elements to address these problems .

Some of these elements were combined because of interrelationships or because a modification to one element would accomplish the objectives of multiple elements. This reduced the list of 33 elements to 20, which was the basis for discussion and prioritization at the Stakeholder Forum on December 14. The list appears below, together with the prioritization criteria developed at the meeting.

<b>Priority</b>	<b>Grade</b>	<b>Element Number</b>	<b>A/S Redesign Element</b>
H	2	3.	Multiple Ramp Rates
H	~2	4.	Separate BEEP Stacks
H	~1	5./17.	Automated BEEP / Scheduling Improvements
	3	6./18.	Ramping requirement, load following and reg energy payment option
H	1	7./12.	Inter-SC Ancillary Service Trades (Approach: Trade “Obligation” – and address preservation of firmness of imports.)
	2	8.	Cong/ASM Integration (relates to 28, 14, 11, 12)
	3	11.	A/S Import limits; and import of regulation
H	1	13.	Ability to bid and self-provide from same unit (Current Phase II)
H	2	14.	Use of non-firm exports for non-spin and replacement reserves



Priority	Grade	Element Number	A/S Redesign Element
H	1	15.	Simultaneous Auction (not product substitution)
H	1	16./31.	Use of replacement reserves and proper cost recovery
	3	19.	Black Start
	3	20.	Voltage Support
H	1	21.	Demand participation and aggregation
H	~1	26.	Reg up/Reg down priced separately
	3	27.	Buy Back of A/S
H	2	28.	A/S Exports (necessary but not ready for July 1 implementation)
	3	32.	Energy of RMR A/S (who pays, PTOs or SCs?)
	3	33.	A/S procurement in Real Time

*The items marked in the table with (H) are candidates for highest priority implementation. All other items are expected to be included in the long-term project. 1=high, ~1=almost high, 2=medium, ~2=almost medium, 3 = low*

At the December 14 meeting, the stakeholders expressed concern regarding the so-called “Min-Max” proposal developed by the ISO. This proposal was intended to address two issues: to correct the incentives that would reduce the incidence of generators not following ISO dispatch instructions, and also the topic of large uninstructed deviations from schedules generally.

There was a great deal of opposition to the Min-Max proposal from the stakeholders, primarily because it impacted, not only the generators that cause the problem, but everyone with an imbalance in real-time. Based on this input, , the ISO developed a compromise proposal based on a stakeholder recommendation, that together with some other redesign elements (notably the element involving procurement of replacement reserves) should help to alleviate the problem. The success of this approach will be judged during the summer 1999 season.

At the December 14 meeting stakeholders helped prioritize the redesign elements, first between higher and lower priorities and then, for the high-priority items, with 1 = high, ~1 = almost high, 2 = medium, ~2 = almost medium. With those priorities, the ISO approached the software vendors to develop cost estimates and schedules to present to the stakeholders at the January 6 Market Issues Forum.

At the January 6 Market Issues Forum, Ancillary Service Market Redesign was the primary topic. The Redesign elements were discussed together with the software estimates. Those items, and the software schedule, are shown below:

Element Number		Ancillary Service Implementation Options January 6, 1999	"Possible Summer '99"
7./12a	H1	Inter-SC Ancillary Service Trades	Yes
7./12b 7./12c	H1	Preservation of Firmness of imports on inter-SC Trades Preserve Credit for Firm Imports and hydro-generation when A/S procured by zone.	Yes Yes
13	H1	Ability to bid and self-provide from same unit (Current Phase II)	Yes
15	H1	Product Specific Simultaneous Auction	No
16./31	H1	Use of replacement reserves and proper cost recovery	Yes
21	H1	Demand participation and aggregation	Yes
5./17	H~1	Automated BEEP/Scheduling Improvements	Yes
26	H~1	Reg up/Reg down priced separately	Yes
3	H2	Multiple Ramp Rates	No
14	H2	Use of non-firm exports for non-spin and replacement reserves	No
28	H2	A/S Exports (necessary but not ready for July 1 implementation)	No
8	H2	Cong/ASM Integration (relates to 28, 14, 11, 12)	No
4	H~2	Separate BEEP Stack	No

\*Possible on stand-alone basis. Resources preclude implementation of all possible items.

Also discussed were the relative benefits of each element, using the three top criteria: (1) increase in supply or availability of A/S; (2) decrease in ISO demand for A/S (i.e., actions that would allow the ISO to procure a lower percentage of reserves without violating reliability criteria); (3) increase in market efficiency. (The summary of these benefits appears elsewhere in this memo.)

Because summer 1999 implementation is a key driver, the discussion centered on the priority H1 and H~1 items identified at the earlier meeting. Cost estimates from the vendor did not rule out any element under consideration.

Because of other high-priority software projects planned and underway at the ISO (e.g., Year 2000 readiness activities), the ISO determined that not all of the priority 1 and ~1 items could be finished by this summer. Further prioritization was necessary to identify the most critical 3 or 4 redesign elements that could actually be implemented for summer 99 implementation. The ISO priorities discussed at the January 6 meeting are discussed in the body of the memo.

## APPENDIX 5 CONSOLIDATED EVALUATION CRITERIA

Number	Criterion
*1	Clearly solve or mitigate a major problem;
*2	Consistent with reliable operation of system;
3	Cost of implementation;
*4	Assigns costs based on causation;
5	Consistent with FERC direction;
6	<p>Effective product design and definition, including</p> <ul style="list-style-type: none"> <li>a. Transparency</li> <li>b. Clear rules for purchase, sale, and use of the product</li> <li>c. Compliance and monitoring of the quality and reliability of the product</li> <li>d. Relationship to other products and markets, including other control areas</li> <li>e. Simplicity and clarity</li> <li>f. Maintenance and enhancement of three distinct markets (DA, HA, RT)</li> <li>g. Enhancement of communications between the ISO and Scheduling Coordinators;</li> </ul>
*7	<p>Enhancement of market participation and supplies, including</p> <ul style="list-style-type: none"> <li>a. increasing supply availability and demand elasticity</li> <li>b. minimizing market constraints and facilitating bilateral markets</li> <li>c. ISO to rely more heavily on market first, to address operational requirements;</li> </ul>
8	Impact on individual market participants and stakeholder groups.

**APPENDIX 6  
SUMMARY OF DISPOSITION  
OF ALL ANCILLARY SERVICE REDESIGN TOPICS**

Topic	Included in Plan?	Priority?
1) Simultaneous provision of Regulating and Contingency Reserves	No (no redesign required)	
<b>2) Uninstructed Deviations</b>	<b>Yes (Consolidated with topics 16/32)</b>	<b>1a</b>
3) Multiple Ramp Rates	Yes	2
4) "Splitting" the BEEP stack	Yes	2
<b>5) Automated BEEP</b>	<b>Yes</b>	<b>1a</b>
6) Load following and ramping	Yes	2
<b>7) Inter-SC Trades of A/S</b>	<b>Yes</b>	<b>1a *</b>
8) Equal competition of between A/S and Energy on inter-zonal interfaces	Yes	2
9) Out-of-market procurement and bypass of markets	Yes (Consolidated with topics 2/16/32)	NA
11) A/S Import Limits	Yes	2
12) Preserving Firmness of Imports	Yes	1b
13) Bid and self-provide from the same unit	Yes	1b
14) Non-firm exports as Non-Spin / Replacement Reserve	Yes	2
<b>15) Auction design changes</b>	<b>Yes</b>	<b>1a</b>
16) Replacement Reserve and proper cost assignment to replace out-of-market calls	Yes, (consolidated with topics 2 and 32)	See item 2
17) Scheduling Improvements	Consolidated with 5	
18) Ramping requirements	Consolidated with 6	
19) Black Start Agreement	No market redesign required	
20) Voltage Support	No market redesign required	
<b>21) Demand Participation</b>	<b>Yes</b>	<b>1a (no software)</b>
22) Geographical differentiation of products	No (met by zonal procurement)	
23) Product differentiation by physical characteristics	No (already addressed by 6/18)	
24) Incentives for Accurate Scheduling	No (already addressed by 16/32)	
25) Unresolved issues list	Yes – No additional measures necessary	
<b>26) Reg up, Reg down priced separately</b>	<b>Yes</b>	<b>1a</b>

**APPENDIX 6  
SUMMARY OF DISPOSITION  
OF ALL ANCILLARY SERVICE REDESIGN TOPICS**

<b>Topic</b>	<b>Included in Plan?</b>	<b>Priority?</b>
27) HA Buy back rates for reduction in DA A/S due to derate	Under review	3
28) Export of A/S	Yes	2
29) Call Contracts	No (Addressed by other elements)	NA
30) Energy settlements for Regulation	No (Use of Regulation addressed by 6/18, and market-based capacity rates)	
31) Proper A/S cost recovery	Yes (consolidated with 2 and 16)	See Item 2
32) Energy out of RMR A/S	Yes	3
33) A/S Procurement in real time	Yes	3

Items shown in bold are proposed for implementation before Summer 1999.

\* To be completed as Priority 1a if possible.

**APPENDIX 7  
ADDITIONAL DETAILS OF  
OPTION SCREENING PROCESS**

Prior to finalizing the prioritization of A/S Redesign elements based on cost and schedule estimates, each element was mapped to and compared against the structural deficiencies in A/S markets that were identified in the Market Surveillance Committee’s August 1998 report. The table contained in Appendix 1 presents this mapping and comparison in terms of three basic categories:

- (A) Reduced demand for Ancillary Services
- (B) Increased supply of Ancillary Services
- (C) Efficiency of Ancillary Services auctions and enhancements to bilateral markets

The following table presents an analysis of the options remaining after the December 14, 1998 meeting with stakeholders based on these criteria.

<b>BENEFITS OF EACH A/S REDESIGN ELEMENT</b>		
(A) Demand Reduction	(B) Supply Enhancement	(C) Auction/Market Efficiency
<b>Element 3. Multiple Ramp Rates</b>		
More precise information about the actual ramping capabilities of units that are providing various services, and that are bid into the BEEP stack, may eliminate some cases where more capacity is included in the BEEP stack than can actually be achieved, thus improving the quality of the BEEP stack and reducing the demand for Regulation. However since the existing database generally includes conservative ramp-rate values, the impact of this change is estimated to be <b>low</b> .	Some units will be able to offer greater capacity into the A/S auctions when the expanded ramp-rate database includes values, contingent on both Energy schedules and the supply offered, that are significantly greater than the single value now included in the database. However, this impact is estimated to be relatively <b>low</b> .	This element has no identifiable direct impact on auction/market processes (other than the supply and demand impacts noted).
<b>Element 4. Separate BEEP Stacks</b>		
This proposal has no direct impact on the ISO’s demand for Ancillary Services.	This proposal has no direct impact on the ISO’s Ancillary Services supplies. It may, however, change the supplies of capacity to different individual	The proposal clarifies the contingencies under which Energy will be called from Operating Reserve, allowing suppliers to more accurately

<b>BENEFITS OF EACH A/S REDESIGN ELEMENT</b>		
<b>(A) Demand Reduction</b>	<b>(B) Supply Enhancement</b>	<b>(C) Auction/Market Efficiency</b>
	services.	gauge, and price, the likelihood of Energy production. The proposal will encourage the bidding of lower-variable-cost capacity into the Replacement Reserve and Supplemental-Energy auctions, and higher-variable-cost capacity into Operating Reserve. The proposal will likely increase O/R capacity prices. These changes are consistent with the operations of efficient markets for contingent generation, and improve as well the valuation of firm Energy (such as firm imports). The combined effect of the proposal is estimated to be a <b>high</b> increase in market and auction efficiency.
<b>Element 5/17. Automated BEEP/ Scheduling Improvements</b>		
Automated BEEP dispatch should significantly improve the ability of the ISO to use Energy bids to follow load, thus reducing the ISO's requirement for Regulation. In addition, by increasing the certainty of call of infra-marginal BEEP capacity, BEEP automation will increase the incentives to submit bids, improving the quality of the BEEP stack and further reducing the requirements for Regulation. The combined impact of BEEP automation on A/S demand is estimated to be <b>high</b> .	There is no separate impact of BEEP automation on A/S supplies.	The impact on overall efficiency is captured in the demand reduction discussion.
<b>Element 6/18. Ramping Req, Load Following, and Regulation Energy Payment Option</b>		
Implementation of a ramping and/or load-following services is estimated to have a <b>high</b> impact on the ISO's demand for	The redesign element has no separate influence on A/S supplies.	The improvement in market efficiency that follows from the introduction of a product designed for a specific need

<b>BENEFITS OF EACH A/S REDESIGN ELEMENT</b>		
<b>(A) Demand Reduction</b>	<b>(B) Supply Enhancement</b>	<b>(C) Auction/Market Efficiency</b>
Regulation, which is now being used to follow load. The change would necessarily involve an increase in demand for the new service, but it is anticipated that the service would be provided by lower-cost capacity not requiring AGC.		is entirely captured in the reduction in ISO demand for Regulation.
<b>Element 7/12. Inter-SC Ancillary Service Trades</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The design element does not directly address any barriers to supplier participation in the ISO A/S auctions.	Facilitating bi-lateral trades will significantly improve the functioning of the A/S market by removing a barrier to trade. The ISO will then conduct a potentially smaller auction as the provider of last resort.
<b>Element 8. Cong/ASM Integration</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	By permitting Ancillary Service capacity to compete with Energy for use of congested transmission facilities, the redesign element will increase potential supplies of Ancillary Services during periods of congestion. However, since the new supplies will have to pay congestion prices for reserved transmission capacity, a <b>medium</b> increase in A/S supplies is estimated.	The ability of A/S capacity to compete for use of congested transmission facilities will provide stronger incentives, where appropriate, for the development of additional transmission capacity and of appropriately-sited generation capacity, either for the provision of Energy or of Ancillary Services. Full competition for transmission capacity is an essential component of the ISO's market design, and the implementation of this redesign element is estimated to have a <b>high</b> impact on overall market efficiency.
<b>Element 11. A/S Import Limits; Imports of Regulation</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	Modifications of A/S import limits, and changes to allow imports of Regulation services, increase the supply of A/S capacity to the ISO markets. However, the direct impact of these changes will be	The ability of A/S capacity to compete for use of congested interties will provide stronger incentives, where appropriate, for the development of additional transmission



<b>BENEFITS OF EACH A/S REDESIGN ELEMENT</b>		
<b>(A) Demand Reduction</b>	<b>(B) Supply Enhancement</b>	<b>(C) Auction/Market Efficiency</b>
	limited when there is intertie congestion. The direct impact of this redesign element on A/S supply is estimated to be <b>medium</b> .	capacity. Full competition for transmission capacity, including interties, is an essential component of the ISO's market design, and the implementation of this redesign element is estimated to have a <b>high</b> impact on overall market efficiency.
<b>Element 13. Bid and Self-Provide from Same Unit</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element has no identifiable influence on supplies of A/S capacity.	This element is a component of the ISO's facilitation of outside markets for A/S capacity. It releases an artificial constraint that prevents units from participating in part in the ISO auctions and in part self-providing (or, therefore, participating in inter-SC trades). As such, it has an estimated <b>high</b> impact on the development of bilateral markets.
<b>Element 14. Use of Non-Firm Exports for Non-Spin and Replacement Reserves</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	This redesign element will have a direct supply-enhancement effect. Given the limited volume of non-firm exports during ISO Control Area peak demand periods, the impact is estimated to be of <b>medium</b> magnitude.	The redesign element has no identifiable direct influence on the functioning of the ISO auctions or of existing or new bilateral markets.
<b>Element 15. Auction Design Changes</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element has no identifiable influence on supplies of A/S capacity.	The redesign element moves the ISO auctions towards the outcomes that would occur under competitive and complete markets, and relieves an existing obstacle to efficient performance. The frequent occurrence last summer of irrational market outcomes indicates that this change is estimated to have a <b>high</b> impact.

<b>BENEFITS OF EACH A/S REDESIGN ELEMENT</b>		
<b>(A) Demand Reduction</b>	<b>(B) Supply Enhancement</b>	<b>(C) Auction/Market Efficiency</b>
<b>Element 16/31. Use and Cost Recovery of Replacement Reserves</b>		
By providing stronger incentives to bid capacity that is expected to be used for energy into the BEEP stack, this redesign element should provide a reduction in the ISO's demand for Regulation. This demand shift is balanced, however, by potentially large increases in demand for Replacement Reserve capacity. Since the latter capacity will tend to have much lower prices than Regulation capacity, the net impact is estimated to be a <b>low</b> reduction in total A/S demand.	The design element offers incentives to generators to bid capacity that would otherwise have participated in Supplemental Energy, or have been used to generate uninstructed in real time, into the Replacement Reserve auction. However, since this shift in supply is accompanied by an increase in demand for replacement reserves, the net effect is estimated to be <b>low</b> .	The design element clarifies to market participants the cost of underscheduling load. As it eliminates a cost-shifting opportunity, it offers an improvement in overall market efficiency. The large improvement in market efficiency may be counterbalanced in part by the creation of an incentive to overschedule. As such, the net effect of the proposal is estimated to be a <b>medium</b> improvement in market efficiency.
<b>Element 19. Black Start</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element has no identifiable influence on supplies of A/S capacity.	While the development of competitive procedures for the procurement of this service would possibly offer improved signals for the provision of appropriate capacity, it has no impact on the existing markets.
<b>Element 20. Voltage Support</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element has no identifiable influence on supplies of A/S capacity.	While the development of competitive procedures for the procurement of this service would possibly offer improved signals for the provision of appropriate capacity, it has no impact on the existing markets.
<b>Element 21. Demand Participation and Aggregation</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element involves the clarification, through the drafting of the Participating Load Agreement, of the conditions under which load may provide Ancillary Services. As such, the redesign element offers some increase in supply. However,	The redesign element has no independent impact on market efficiency.

<b>BENEFITS OF EACH A/S REDESIGN ELEMENT</b>		
<b>(A) Demand Reduction</b>	<b>(B) Supply Enhancement</b>	<b>(C) Auction/Market Efficiency</b>
	since load could provide these services in the absence of the PLA, the total impact of the redesign element is estimated to be <b>low</b> .	
<b>Element 26. Separate Pricing for Upward and Downward Regulation Capacity</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element has no identifiable influence on supplies of A/S capacity.	The redesign element eliminates an existing and serious flaw in the procurement procedures for Regulation, and thus has an estimated <b>high</b> immediate impact on the efficiency of the ISO's auctions for Regulation services.
<b>Element 27. A/S Buy-Back</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element has no identifiable influence on supplies of A/S capacity.	The redesign element has no independent impact on market efficiency.
<b>Element 28. A/S Exports</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element has no identifiable influence on supplies of A/S capacity.	The redesign element has no independent impact on market efficiency, at least from the standpoint of the ISO. It would enhance the effectiveness of A/S markets outside the ISO control area, and improves the quality of the price signals to A/S exporters within the ISO control area, but has no direct impact on the proximate goal of developing workably competitive markets within the ISO area.
<b>Element 32. Charging of Energy from RMR A/S</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element has no identifiable influence on supplies of A/S capacity.	The redesign element has no independent impact on market efficiency. While it eliminates some cost shifting, where Energy costs were born by PTOs, these costs were not avoidable by the PTO's, rather representing a

<b>BENEFITS OF EACH A/S REDESIGN ELEMENT</b>		
<b>(A) Demand Reduction</b>	<b>(B) Supply Enhancement</b>	<b>(C) Auction/Market Efficiency</b>
		lump-sum transfer of funds, with no implied efficiency cost.
<b>Element 33. A/S Procurement in Real Time</b>		
The redesign element has no identifiable influence on ISO requirements for Ancillary Services.	The redesign element may allow some additional capacity to participate in the provision of Ancillary Services that is available and capable but was not selected in the DA or HA markets. However, the total impact of this change is estimated to be relatively <b>low</b> .	The redesign element has no independent impact on market efficiency.

**APPENDIX 8**  
**DESCRIPTION OF HIGH PRIORITY MEASURES**  
**INCLUDED IN A/S REDESIGN PLAN**

Product Descriptions

**1. Design Element 7a: Inter-SC Trades of Ancillary Services.**

Currently, ISO software does not allow for Scheduling Coordinators to physically trade Ancillary Services. This means that any Scheduling Coordinator that has load must either self-provide Ancillary Services from its own generation, purchase Ancillary Services from the ISO, or arrange a financial contract for differences. It also means that any Scheduling Coordinator with excess Ancillary Services capacity cannot physically sell it to another Scheduling Coordinator, but only to the ISO.

This change will allow Scheduling Coordinators to trade Ancillary Services obligations so that any Scheduling Coordinator may self-provide its Ancillary Services requirement through a purchase of Ancillary Services capacity from another Scheduling Coordinator. This would be in addition to the existing options to self-provide Ancillary Services capacity obligations from its own resources or purchase Ancillary Services capacity from the ISO auction.

This feature would be implemented by having Scheduling Coordinators trade Ancillary Services capacity obligations so that any Scheduling Coordinator may self-provide its Ancillary Services requirement through a purchase of Ancillary Services capacity from another Scheduling Coordinator.

This feature would be implemented by having Scheduling Coordinators trade Ancillary Services obligations whereby Scheduling Coordinator A and Scheduling Coordinator B would tell the ISO that some or all of Scheduling Coordinator A's Ancillary Services obligations are transferred to B and then the ISO would treat Scheduling Coordinator B as if all of its own, plus the transferred Ancillary Services requirements, need to be satisfied by Scheduling Coordinator B.

**2. Design Elements 7b & 7c: Preservation of firmness of imports during inter-SC trades and preservation of firmness and operating reserve hydro/thermal percentage calculations when Ancillary Services are acquired zonally.**

Currently the firmness of an import is lost when energy is traded in an inter-SC trade. This results in a Scheduling Coordinator losing credit for operating reserve that comes with a firm import when they trade the energy to another Scheduling Coordinator. In addition to the above problem, the 5% hydro and 7% thermal/other calculation for operating reserve is lost when the ISO procures Ancillary Services zonally due to congestion. This causes Scheduling Coordinators to be given Ancillary Services obligations they should not have.

The change will be to software which will allow for correct designation and tracking of imports and appropriate retention of generator characteristics in all the situations listed above. This is an implementation flaw that currently exists in the software that should be fixed.

**3. Design Element 13. Ability to bid and self-provide from the same unit.**

Currently the ISO software will not allow a Scheduling Coordinator to bid and self-provide the same Ancillary Service from the same unit for the same hour. This means that unit "A" cannot bid spinning reserve and self-provide spinning reserve in the same hour. Unit "A" can, however, bid spinning reserve and self-provide non-spinning reserve in the same hour.

The change will be to software that will allow an Scheduling Coordinator to bid and self-provide the same service from the same unit in any hour. The total of any service, bid and self-provided, would still be limited by ramp rates and unit operating constraints.

**4. Design Element 15: "Rational Buyer" concept.**

Currently the ISO software uses a sequential auction method and purchases a predetermined quantity of each Ancillary Service. This purchase is made without any "comparison shopping" to attempt to acquire needed service at minimum cost to market participants and ultimately the load. This approach has significant flaws which have been identified by the ISO, the MSC and by FERC.

This approach would be implemented before Summer 1999 and would have the ISO use a process to adjust the predetermined quantities of each Ancillary Service to be purchased in such a way as to take advantage of Ancillary Services that can technically satisfy the requirements of other Ancillary Services, when doing so will lower the total cost of A/S.

The second stage could be the implementation of a product specific simultaneous auction "PSSA." This auction allows the ISO to "comparison shop" and acquire the needed slate of services at the lowest cost to the ISO. The second stage does not continue the practice of adjusting the demand quantities. Instead it looks at all bids for all services at the same time, rather than sequentially, and purchases a slate of required services at the least cost. However, the ISO's MSC has reviewed this proposal and believes it would be a step backward, and therefore believes it should not be pursued.

An additional possible refinement and further optimization is possible which would overlay the demand adjustment process on top of the PSSA. This would provide maximum possible optimization. It is not part of the current proposal for two reasons. First, the considerable majority of the optimization benefit can be had with the PSSA approach. Second, market participants have expressed

considerable discomfort with the demand adjustment feature both for the interim and for the long term. Some market participants are okay in the short term with the demand adjustments on the basis that it will be only interim in nature and will go away when the PSSA is implemented.

**5. Design Elements 16/31 and 2. Use of replacement reserves, proper cost allocation and proposal for handling uninstructed deviations.**

Currently, the ISO purchases replacement reserve only for reliability needs and relies on out-of-market purchases for energy shortfalls between the final schedules and actual load needs in real time. This resulted in many instances of significant out-of-market purchase activity on peak days in 1998.

Replacement reserve allocation is currently done in two ways. First, replacement reserve whose energy is dispatched from the BEEP stack during real time has its capacity costs allocated to Scheduling Coordinators in proportion to their deviations from final schedules. The remainder of the capacity costs are spread to metered demand and scheduled exports. Uninstructed deviations are all settled at the average price for the hour.

The change will require the ISO to acquire additional replacement reserve. In addition to replacement reserve acquired for reliability purposes, the ISO will acquire replacement reserve to account for the difference between the ISO load forecast and the load scheduled by Scheduling Coordinators. The ISO may acquire up to 100% of this difference or less, depending on the ISO estimate of the supplemental energy that is likely to be bid into the real time imbalance market.

The change will also allocate the Replacement Reserve obligations to Scheduling Coordinators according to the magnitude of their deviations from final schedules. This means that for each MW of deviation between metered amounts and final schedules a Scheduling Coordinator will be assigned one MW of Replacement Reserve obligation.. This will assure that Scheduling Coordinators with deviations pay appropriate capacity costs.

In addition, the proposal on uninstructed deviations will remove the arbitrage opportunity between 10-minute interval and hourly ex-post prices that currently economically encourages generators to disregard ISO instructions. This will be accomplished by settling uninstructed deviations in units that have had instructions at the "effective price" for that unit for that hour, which will cause the refund to the ISO to equal the payments received.

**6. Design Elements 5/17. Automated BEEP.**

Currently the ISO makes all notifications to units in the BEEP stack by telephone except units on AGC. This is slow, cumbersome and results in skipped bids, out-of-sequence calls and other operating and market problems. This also gives rise

to price distortions since out-of-sequence bids are paid as bid instead of setting the interval price as they should.

The change will create a system that allows the notification of units that have bids accepted communications network. It will also allow the Scheduling Coordinator to acknowledge the notification over the network so that no telephone use is required.

This change will be implemented with software modifications, both at the ISO and at the Scheduling Coordinator location and using the existing communications network.

**7. Design Element 26. Pricing regulation up and regulation down separately.**

Currently the ISO specifies a quantity of regulation up service and a quantity of regulation down service needed for each hour. This is based on calculations of interchange ramp, generation ramp and projected load changes. Even though the two products are specified and purchased separately, the highest clearing price for either services is used to set the price for both services. This results in paying considerably more for regulation than would be paid if separate prices were established for each service.

The change will pass both clearing prices to settlements and will create two prices, one for each service. This will reduce total payments since a scarcity of one product and its resultant high price will not be paid for both products.

**8. Design Element 21. Participation of loads including load aggregation in the Ancillary Services market.**

Currently the ISO allows loads to be bid into the Ancillary Services market as non-spinning reserve and as replacement reserve. The mechanism and rules for this participation have not been clear, particularly for small loads that must be aggregated to meet the minimum 10MW threshold for Ancillary Services participation.

The change would specify conditions, rules, metering and other technical requirements to allow loads to more significantly and meaningfully participate in the markets.

The change would be implemented by the creation and filing of Participating load agreement "PLA" which would specify the conditions and technical requirements needed for participation by loads in the Ancillary Services markets. This agreement is under development in a stakeholder process at the present time. The implementation does not require software changes at the ISO, although metering and other technical requirements may be necessary at the load, as well as appropriate communications to the ISO to allow the load to meet the technical requirements of the market in which it participates.