The Opinion of the CAISO Market Surveillance Committee on
The Rational Buyer Protocol

At its meeting of January 15, 1999, the Market Surveillance Committee (MSC) discussed several proposed approaches to the rational procurement of Ancillary Services (A/S) by the ISO.

The current protocol for purchasing Ancillary Services involves the independent sequential evaluation of bids for different services, with the market for Regulation cleared first, followed by the markets for Spinning Reserves (Spin), Non-spinning Reserves (Non-Spin), and Replacement Reserves in that order. The ISO's demand for each service is fixed and announced before the A/S bids are submitted.

In its August 19, 1998 report to the FERC, the MSC pointed out that announcing a perfectly price-inelastic demand for each service and employing a strict sequential bid evaluation process enhances the ability of market participants to set excessive market-clearing prices. Under these market rules, the ISO can pay, and often has paid, substantially more for Ancillary Services than it would have had the ISO been allowed to substitute among these services based on their price while still meeting its overall ancillary services needs. The MSC pointed out that a rational buyer trying to meet the ISO's ancillary services requirements would substitute a lower-priced, higher-quality service for a higher-priced, lower-quality service.[1] For example, if the Spin price is considerably higher than the Regulation price, and Regulation capacity is available, the rational buyer can generally reduce its costs by buying more Regulation and less Spin. This approach and its variants are generally referred to as the Rational Buyer framework.

The majority of the market participants (mainly the generators and the energy traders) have expressed concern about giving the ISO the ability to fill its needs for one Ancillary Service with bids for another after seeing the bids. They instead suggested a simultaneous optimization of the Ancillary Service markets while keeping the demand for each service fixed at the levels announced by the ISO prior to bid submission. This approach and its variants are generally referred to as the Product Specific Simultaneous Auction (PSSA) framework.

The MSC analyzed a number of options that had been proposed under each framework to introduce some rationality into the ISO's behavior. These included:

- Price-Comparing Rational Buyer with Sequential Auction (Rational Buyer Type 0)
- Cost-Comparing Rational Buyer with Sequential Auction (Rational Buyer Type 1)
- Cost-Comparing Rational Buyer with Simultaneous Auction (Rational Buyer Type 2)
- Product Specific Simultaneous Auction (PSSA)

[1] This statement was strictly true when Regulation capacity was a service based on 10-minute ramp rate; Regulation is now a 30-minute product, but may return to being a 10-minute product by the beginning of the summer.

Rational Buyer Type 0 provides for substitution of a higher quality service for a lower quality service when the higher quality service bid price is lower than the lower quality service market-clearing price before such substitution. It does so sequentially without taking into account the impact of additional procurement of the higher quality service on the market-clearing price of that service. A comparison of the total procurement cost with the present ("irrational") method is made only after the process is completed for all A/S markets. If the comparison indicates an overall cost reduction, the resulting solution is accepted, and the original demands for each of four ancillary services are adjusted accordingly. Otherwise, there is no change in the original demands for the four products. This process can be implemented as a pre-processor to the existing ancillary service software. It will simply transform the vector of the ancillary service requirements (demand) to a new vector based on the observation of the bid prices. The MSC supports rational demand substitution, but does not consider this approach a "rational" method for demand substitution since it ignores the "cost" impact in evaluating the substitution decisions. The MSC therefore considers this solution inadequate and unacceptable as an implementation of the Rational Buyer approach which was stated as a pre-condition for raising the A/S price caps from the present level of $250/MW to a new level of $750/MW.

Rational Buyer Type 1 allows the ISO to increase its demand for a higher quality service and reduce its demand for a lower quality service if and only if this substitution is cost-effective. The ISO substitutes across products sequentially with the possibility of looking ahead to all subsequent markets in deciding the most cost-effective mix of demands for—regulation, spin, non-spin and replacement reserves--in order to satisfy the ISO's total ancillary services requirements. Since Rational Buyer Type 1 only alters the original demand vector, it can be implemented as a pre-processor to the existing ancillary service software with minimal effort. Because it considers the cost impact in each substitution step, it can go beyond the Rational Buyer Type 0 in reducing the ancillary service costs to the ISO market. The MSC recommends this approach for short-term implementation (by the summer of 1999) while more effective longer-term measures are being worked out. The MSC also considers the proper implementation of this type of Rational Buyer method (Type 1) adequate as one of the pre-requisites for raising the A/S price caps from the present level of $250/MW to a new level of $750/MW.

Rational Buyer Type 2 permits substitution of both supply and demand bids across the four products if such actions reduce total ancillary services purchase costs. For example, the regulation bid from a generating unit may not be used for regulation even though it is cheaper than the regulation market-clearing price if using that unit's spin bid in the spin market reduces total ancillary services costs. This type of outcome cannot be obtained from the current market-clearing process by a transformation of the demands for the four ancillary services, so it is not amenable to implementation as a pre-processor to the existing software. It can be implemented only as a longer-term solution. It can go beyond the Rational Buyer Type 1 in reducing the ancillary service costs to the ISO market. Although the MSC believes that this protocol would be very effective in reducing A/S procurement costs, it does not recommend its adoption at the present time. Because this approach would require a significant re-writing of the ancillary services software, the

MSC is told that implementing an ancillary services procurement process based on this protocol would most likely take until after the summer of 1999. Consequently, depending on the success of the ancillary services protocol actually implemented in limiting the ability of market participants to set excessively high prices, the MSC may decide that the benefits of this approach to ancillary services procurement are outweighed by the costs of the software changes.

The PSSA method does not permit any demand substitution. Two versions of PSSA have been proposed: a "price minimizing" version based on minimizing the classical sum of the products of bid prices and quantities, and a "procurement cost minimizing" version that minimizes the product of market-clearing prices and quantities (i.e., payment for ancillary services). In both cases, the protocol uses each bid only to satisfy the demand in the market it was bid into, while minimizing the overall objective function. The "price minimizing" version is clearly inappropriate for the competitive market in which all bidders are paid the market-clearing price. In some cases, it may even result in payments higher than the existing "irrational" procurement method. The "procurement cost minimizing" method improves upon the present "irrational" sequential method. Its cost saving impact may be inferior or superior to that of the Cost-Comparing Sequential Rational Buyer (Type 1) depending on the bids submitted, but will never exceed that of Rational Buyer Type 2. It cannot be implemented as a pre-processor to the existing software, and requires the same degree of software modifications as Rational Buyer Type 2. The MSC believes that this approach does no go far enough in mitigating the potential for the exercise of market power associated with a completely price-inelastic demand for each service, and is therefore not an acceptable long-term solution. However, we should emphasize that there may exist simultaneous auction market designs which allow sufficient substitution possibilities in the procurement of ancillary services to mitigate the potential for excessively high prices in these markets.

To summarize, the MSC's recommendation is as follows:

1. Implement the Cost-Comparing Sequential Rational Buyer, i.e., Rational Buyer Type 1, in the short-term before summer 1999.
2. Explore other long-term implementations of the Rational Buyer concept, so long as they improve upon the short-term implementation and are in no way inferior to Rational Buyer Type 1 under any circumstances. In particular, depending on the market outcomes under Rational Buyer Type 1, the MSC may conclude that Rational Buyer Type 2 is necessary to limit the ability of generators to set excessively high prices.
3. Proper implementation of the Cost-Comparing Sequential Rational Buyer (i.e., Rational Buyer Type 1) satisfies one of the pre-requisites (implementation of the Rational Buyer software) adopted by the ISO Board for raising the A/S price caps from the present level of $250/MW to a new level of $750/MW.