

Appendix C

The ISO's Detailed Work Plan

The following is a work plan describing action under way or contemplated. Except for changes authorized by the ISO Board and, if applicable, filed with FERC, all proposals are still subject to full stakeholder processes and necessary review and analysis of their technical and financial feasibility as well as their potential effect on markets.

Actions in Progress

(a) Ancillary Service Management Software Modifications

A number of deficiencies in the ISO Ancillary Services Management (ASM) software have led to either an apparent reduction of ancillary services supply or an increased demand for ancillary services. Modifications to the ASM software, due for release on September 21, should correct some of the problems (items 2, 3, and 4) listed in Appendix A of the MSC Report. They are the following:

- Treatment of Downward Regulation in Sequential Ancillary Service (A/S) Evaluation. This change will result in an increase in capacity included in the auctions for operating- and replacement-reserve services. Amendment No. 11 to the ISO Tariff, filed with FERC on August 14, would permit this change. Interventions and protests were due by August 28, 1998.
- Coordination between Congestion Management and Ancillary Services Management Software. By making the A/S capacity schedule consistent with final energy schedules, this modification will enable the ISO to procure ancillary services truly available from the capacity of the generating units, curtailable loads, and interchange. It will also enable the ISO to enforce penalties that were temporarily suspended by Tariff amendments 6 and 10.
- Verification of Eligibility of Ancillary Service Bids. The new Ancillary Services Management software will ensure that the capacity bid from a unit into the ancillary services markets does not exceed its available and uncommitted capacity, taking into account the approved ramp rate, the available range, and the unit's energy-schedule commitments. The change will improve the reliability, and therefore the quality, of ISO reserves, and may as a result lead to some decrease in demand for such reserves.

(b) A/S Imports and Procurements from Municipal Utilities

A fundamental problem with the current functioning of the ancillary service markets is an inadequate number of providers and an insufficient overall capacity bid into the A/S markets. This condition was identified in both Committee

reports. Having completed work on staged software, the ISO now permits out-of-control-area procurements of ancillary services (except regulation reserve). External import of ancillary services from resources located in other control areas commenced on August 6, 1998. Seven scheduling coordinators have been certified to bid A/S imports into the A/S markets. The bids started around 100 MW and are now ranging from 100 MW to 500 MW in each market. These levels only partially alleviate the current supply shortfall. Further information is provided in Appendix B to the ISO's Comments.

The ISO also is discussing with the Participating Transmission Owners and the municipal utilities how Existing Contracts can be renegotiated to permit municipal utilities and other generating facilities geographically located within the ISO control area to bid into the A/S markets. Municipal utilities, to the extent they become a Scheduling Coordinator or establish a relationship with the Scheduling Coordinator, are not preempted from selling ancillary services to the ISO today.

(c) Tracking Uninstructed Generation from A/S Reserve Capacity

The second finding of the ISO MSC is that "the demand for ancillary services has been higher than anticipated." One source of the apparent high demand for Regulation and for operating reserves is uncertainty on the part of the ISO whether supplies that have been committed to the real-time balancing energy (Balancing Energy and Ex-post Pricing or BEEP) stack of bids will be available if called upon. As stated in MSC report, Appendix A (item #9), in hours where the ex-post price is high, some generators with winning A/S capacity bids have overgenerated to capture the high prices. These uninstructed deviations consume operating and replacement reserves for which the ISO has paid in the day-ahead or hour-ahead markets. Such capacity is obligated to be unloaded until called by the ISO. If the ISO calls such a generator, it will not have unloaded capacity able to meet the terms of its bid, and the ISO will enforce the penalty provisions to rescind payments for ancillary service capacity under Section 2.5.26 of the ISO Tariff. If the generator is not issued a dispatch instruction by the ISO, that generator is still paid based on Uninstructed Imbalance Energy. This is encouraging generators to use ancillary service capacity for uninstructed deviation, particularly when the real-time prices are high. This practice makes the BEEP stack an unreliable indicator of the system's actual spare capacity. To ensure reliability in periods of high load, the ISO must purchase a higher level of reserves.

The ISO is now manually tracking compliance violations of this sort, and may issue notices, warnings, and penalties to Scheduling Coordinators to discourage this behavior.

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(d) Real-time Energy Balancing and Ex-post Pricing Software Modifications

A number of deficiencies in the ISO real-time dispatch software (Balancing Energy and Ex-post Pricing, or BEEP) have also contributed either to an increased demand or reduced supply for Ancillary Services. As mentioned above, the ISO must purchase on a more conservative basis given uncertainty on the part of the ISO operators that supplies that have been committed to the real-time supplemental-energy stack (referred to as the BEEP stack) will in fact be available when called upon. Reduced supply may also be caused by generators holding capacity out of the A/S auctions in favor of supplemental energy bids. This is more likely if bidders expect a rapid bid-up in prices in the real-time market. Several modifications to address the BEEP run-up are planned. These will be staged over several releases of the software.

Included among these modifications is the change to facilitate Tracking of Operator Dispatch Instructions and Responses, scheduled for release later in 1998. This issue was mentioned in MSC report, Appendix A (item #1). The adjustment will permit BEEP to compute the existing Imbalance Energy price more accurately and to correctly identify the units available for dispatch. This software variance was first described in Amendment No. 7, filed March 31, 1998. The expected software modification has been delayed from when it was scheduled due to its complexity. A manual process reduces the impact of this software deficiency, but does not eliminate it. Moreover, even after eliminating this software variance, as long as demand remains inelastic (incapable of refusing to buy at exorbitant prices), a "damage control cap" on the ISO real-time price remains prudent.

(e) QF Bids

Facilitating bids from qualifying facilities (QFs) - For these generators to bid into the A/S market, most, if not all, must modify their existing contracts.

(f) Operational Audit

The ISO Audit Committee has retained an independent auditor to conduct an operational audit that is both one phase of the previously planned SAS70 Audit and a more expansive review of control room activities. The audit is to be completed in two stages in September and October 1998, respectively. The results of the audit should address some of the questions raised in the MSC report concerning impact of the current Control Room operating practices on the ancillary services markets (MSC report Sections 4.6 and 5.6).

Short-Term Potential Proposals

(a) Rational Buyer

The MSC recommends “that the ISO adopt the common sense rule of applying a bid to supply a higher quality ancillary service to the provision of a lower quality ancillary service when doing so reduces purchase costs” (MSC Report, page 38). The MSC notes that their telephone conversations with market participants, as well as opinions expressed at a public meeting, indicate that a proposal for a rational buyer protocol of this sort would be well received. There are software and tariff changes necessary for such a protocol to be implemented. ISO management is working with stakeholders to develop a specific proposal to present to the Board, and to FERC.

(b) Lift FERC Cost-Based Caps

The MSC recommends, as a precondition to the markets reaching their intended form, the elimination of cost-based caps for the remaining firms that are subject to them (the investor-owned utilities). The IOUs own a large share of the capacity suitable for A/S supplies, but significantly when must bid under transmission tariff rates into the regulation, spinning and non-spinning reserve auctions. The capped rates are low compared to sometimes substantial prices in the day-ahead PX and real-time energy markets. This results in a very strong disincentive to bid capacity into the ISO’s reserve markets. This causes market shortages and allows firms with market-based rates to set extremely high prices no matter how small their particular market share of supply.

The ISO supports the lifting of FERC cost-based caps for all generators including large IOUs, subject to a mechanism to mitigate the potential exercise of market power. Normal market mechanisms fail to function when a substantial portion of the supply is subject to bid caps and the rest are free to bid any price. Therefore we support the committee’s recommendation of lifting the cost- based cap as a means of increasing supply into the market.

However, the ISO also appreciates the Commission's position that each entity must file for market-based rate authority and that such filing must demonstrate that the entity does not have market power.

The ISO is currently considering several options for this purpose. Options include:

- Design a new bid cap for entities with only cost-based rate authority, for example, indexed to the day-ahead PX energy price. Entities currently subjected to cost-based rate caps would then be eligible to bid (and be paid) the higher of their current cost-based rates or the indexed cap (for example

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indexed to the day-ahead PX price). An indexed price cap for those under cost-based caps is very similar to the solution applied under the Regulation Energy Payment Adjustment (REPA) payment for regulation service. This mechanism of indexing cost caps to their opportunity cost of supply made a tremendous improvement in the bid sufficiency in the regulation market (See data in Appendix A). A similar cap indexed to opportunity cost may induce supply in all the A/S markets.

This proposal is different from the contracts for differences (CFD) option in the MSC's recommendation. Negotiation of contracts for differences with each IOU may take considerable time, particularly to define the appropriate quantities and prices. Thus, this appears to be a long-term solution subject to further study and stakeholder comment.

- Reducing the fixed-level damage-control caps. Appendix A reports the frequency of prices hitting the \$250 cap. If high prices are the result of profit seeking exercise of market power and do not reflect underlying cost, lower price caps may not result in less supply. The Board concluded, however, that condition did not warrant lowering the cap. This decision was made based on recommendations of the ISO's Market Surveillance Unit and the Market Surveillance Committee. The Board will review the issue again September 24, 1998.
- Implement a market-wide indexed damage-control cap. Under this proposal, a market-wide price cap would be established based on the energy price in the dominant energy market in California. Such a cap would limit the prices of ancillary services capacity (an option to buy the commodity) to the energy price (the commodity). A market-wide indexed cap would be based on the price that would emerge from well-functioning markets, and in fact, above the prices that such markets would produce. In other words, so long as there is a non-zero probability that reserve capacity will be called upon to supply energy in real time, a seller could be paid, both the option price and the commodity price.

Currently, the PX energy cap is \$2,500/MWH. If a scarcity price signal develops in the PX, participants in the ISO markets could receive up to \$2,500/MW for capacity. Under this option the price would reinforce the incentives for new resource development coming from the PX. This factor must be taken into account in analyzing the PX-indexed alternatives mentioned. For example a PX-indexed damage control cap could be considered an indirect increase of the present cap from \$250 to \$2500, while considering the fact that an option (ancillary service capacity) should not be priced more than the commodity itself (energy).

There are significant issues that must be addressed before any proposals can be considered to change the price caps. These include the appropriateness of a PX-indexed price, potential for exercise of market power by those IOUs still dominating the PX market, whether damage control caps are necessary for hour-ahead capacity prices, the role of caps in the real-time market, and whether to cap prices differentially by zones. In the case of a reduction in the damage control cap, methods are required to identify the appropriate level, and questions to answer regarding whether the same level is appropriate in all A/S markets. The ISO is actively discussing these issues internally, with stakeholders and the Market Surveillance Committee.

(c) Correct settlement of uninstructed deviations

As discussed above, uninstructed deviations cause substantial increases in ISO's demand for ancillary services. The failure to respond to calls for energy in real time, whether from Operating Reserve or from Supplemental Energy bids, causes ISO operators to purchase larger quantities of ancillary reserves. ISO is studying possible mitigation measures, including the correction of an existing Tariff provision regarding settlement of uninstructed Deviations as identified in Appendix A (item 10) of the MSC report.

Settlement of uninstructed deviations based on the hourly average of 10-minute imbalance energy prices provides an incentive not to follow ISO's dispatch instructions. The BEEP software assumes a dispatch instruction is followed. Firms get paid higher "instructed deviation" prices (10-minute incremental price) based on "dispatch instructions" even if they do not comply; they receive the lower price for not following those instructions. Similarly, they can make money when instructed to reduce generation (and pay low 10-minute decremental price), by ignoring the instruction and receiving a higher price (the Hourly Ex-Post Price). A possible solution is to charge uninstructed under-generation (or over-consumption) the highest hourly 10-minute incremental price, and pay over-generation (or under-consumption) the lowest hourly 10-minute decremental price. Regulation which is under ISO's direct control, would still be settled at the Hourly Ex-Post Price. This will in effect more closely assign responsibility to the entities imposing costs on the ISO system in real-time.

(d) Improve Allocation of Charges for Replacement Reserve

At present, the costs of ISO's purchases of Undispatched Replacement Reserve capacity are charged to the SCs in proportion to their scheduled load. Dispatched Replacement Reserve capacity (from which energy is instructed by the ISO in real time) is currently charged based on the net deviation from schedule in accordance with the ISO Tariff. The ISO Staging Plan No. 4 envisions changes in the allocation of Replacement Reserve to improve price signals. The ISO is evaluating these and other options, including billing all Ancillary Services based on metered demand (as described below). These issues will be explored with

Market Participants in the coming weeks, and the ISO will then address the settlement software deficiency noted in Appendix A of the MSC report (item # 6).

(e) Charge A/S based on metered demand

At present the costs of Ancillary Services are charged on a pro-rated basis to Scheduling Coordinators based on their scheduled loads. This creates an incentive to under-schedule in the Day-Ahead and Hour-Ahead Markets, and to rely instead on either supplemental energy bids or uninstructed generation in real time. Improved settlement software should permit charges to be assessed on metered demand. These changes should improve the functioning of both the forward and real-time energy markets, and reduce the demand on Operational Reserves to accommodate fluctuations in those markets. This addresses the concern expressed by MSC in Appendix A of their report (item # 5). The change would require a Tariff amendment.

Long-Term Planned Proposals

The MSC report makes a number of contributions to the ISO's ongoing market redesign process. This process, which brings together the ISO, the participants in the ISO markets, and other stakeholders, has already produced a number of suggestions for redesign of the ancillary-service markets, and is likely to produce others. Some of these suggestions, as well as most of the suggestions raised in the MSC Report, are discussed below. These suggestions, as well as others to be developed, are part of the ongoing market redesign process.

(a) Requirement for Downward Regulation

As stated in the MSC report (Appendix A, item # 12), at present ISO software allows the ISO to set the requirement for regulation only as a percentage of the load, without consideration of the direction of regulation. The ISO may end up paying for excessive regulation in a direction that it does not need, and/or may have to procure more regulation (or call upon RMR units) to ensure it does get adequate regulation capacity in each direction. The ISO software will have to be redesigned to permit procurement of upward and downward regulation separately. This may also, however, require a Tariff amendment.

(b) Load-following Product

A major source of the apparently high demand for ancillary services (particularly regulation) is the lack of proper load following capability within the hour and across the hour boundaries. The ISO is considering changes to its real-time balancing energy software (BEEP) to provide such a service using the BEEP stack. That could require substantial redesign of BEEP, provision of real-time generation data, and possibly additional generating unit equipment to receive BEEP instructions. In effect, Regulation Reserve is being used to substitute for what the integrated utilities had as a load following service because the ISO does not have this capability.

Another product yet to be unbundled in the restructured California energy market is a “look-ahead” capability for real-time energy requirements. Currently market participants cannot bid for blocks of hours (e.g., 30\$/MWh if on for 4 hours). Such a product would allow the ISO to procure supplemental energy competitively several hours ahead of the peak afternoon hours on heavy load days, instead of procuring it out-of-market from neighboring areas.

The development and/or modification of A/S products to create a separate load following service and look-ahead capability would be significant changes in the market-design. As such, these changes lie outside the short-term projects and proposals that are the principal focus of the Committee Reports and of the ISO’s comments. ISO expects, however, to address these issues as part of its market redesign process. The development of such products will involve extensive economic and engineering analysis, substantial discussions with stakeholders and regulators, and, if implemented, investment in software.

(c) Long-Term A/S Procurement

A partial alternative to the day-by-day procurement in markets of ancillary services is the execution of long-term contracts with generators and loads for various reserve capacities. ISO already procures black-start and voltage support services using this approach. The regular use of such alternative procurement practices requires substantial study and discussion to determine its long-term impacts on the A/S and energy markets and would require Tariff amendments.

(d) Contracts for Differences

The ISO Market Surveillance Committee recommends “purely financial contracts for differences (CFDs) for a fixed pre-determined yearly pattern of ancillary services quantities ... as a pre-condition for granting market-based rates to the remaining regulated firms.” (MSC Report, page 44.) The ISO places a high

priority on granting market-based rates to the remaining regulated firms, and is concerned that negotiating a pattern of CFDs, and agreeing on a structure of strike prices, may be very difficult and time-consuming, leading to long delays in granting market-based rates. For this reason, the ISO placed the CFD discussion on its longer-term market redesign agenda. The granting of market-based rates will therefore be tied to modifications of the structure of caps on reserve capacity prices if available in the near term.

(e) Option Contracts for A/S

The MSC argues that “RMR contracts in their current form have done very little to reduce market power problems, and most likely contribute to them,” (MSC Report, page 41) and suggests instead that ISO “treat the RMR contract as a reliability insurance policy purchased by the ISO from a generating facility,” (page 42) with a negotiated payment up-front covering capital costs, and allowing ISO to call on the capacity to provide specified services at will. This proposal is a form of a long-run A/S contract (although with an option clause which should reduce cost to the ISO when the markets are providing sufficient A/S capacity at a low price) discussed above. The ISO will study the possibility of option contracts for ancillary services. However, given the present RMR contract negotiations, which are in their final stages, this issue is being placed on the longer-term market redesign agenda.

(f) Transparency of Public Market Information

Providing adequate, clear, and timely market information to the market participants is essential for proper functioning of the market. Enhancing the present Public Market Information (PMI) will have a positive impact on market performance. For example, the MSC report, Appendix A (item # 8) mentions the desirability of publishing 10-minute price signals.

On a short-term basis, the ISO will be implementing a work-around manual to publish 10-minute prices. A solution that is integrated with the ISO's scheduling system software will be available over a longer term.

To augment the effectiveness of the PMI, the ISO is also considering training programs to ensure common understanding of the significance and effective use of the PMI.

(g) Demand-side bidding

Load is currently able to bid into the Non-Spin and Replacement Reserve markets, as well as supplemental energy. The ability of the load to self-select in a price-sensitive manner is a key to proper functioning of the market. Development of additional products for demand-side bids is a priority for the ISO.

(h) AGC on more participating generators

Presently, the ISO must communicate dispatch instructions by voice to the units not equipped with Automatic Generation Control. Some units are not even manned, and cannot be dispatched by the ISO. Automatic control of such generation sources would facilitate the dispatch process, and most likely would lead to a more competitive ancillary services market by expanding the pool of the participants. This is technically feasible. The economic decision rests with each generator at present. The ISO will consider whether the market as a whole should subsidize installation of AGC.

(i) Enhance self-provision of A/S

Currently, the PX software does not allow the PX participants to self provide A/S. PX self-provision of A/S would be a step towards reducing the ISO's market requirements for ancillary services. Other SCs can self-provide. However, the ISO's software currently does not permit bidding and self-providing from the same unit within the same operating hour. An enhancement of the ISO settlement software to allow both from one unit is scheduled for mid-1999.

(j) Accounting for the impact of ancillary service auction on congestion management

Presently the Ancillary Service Management (ASM) and Congestion Management (CONG) software both ignore the potential impact of ancillary services on inter-zonal congestion. The dispatch of A/S can cause congestion, and under some conditions it can also relieve congestion within the ISO control area (e.g., Path 15). Accounting for the impact of ancillary services in congestion management and the A/S auction would eliminate potential inefficiencies. This may require a Tariff amendment and will require substantial software changes to be implemented.

Note that this issue is distinct from the software modification mentioned under **Actions in Progress** (item a). The change in progress will resolve conflicts between ASM and CONG so that the ASM software will recognize when a

congestion adjustment reduces available capacity for A/S of a generating unit, load , or interchange.

(k) Portfolio Bidding of Ancillary Services

Current ISO rules require SCs to schedule their ancillary services by individual resources. SCs would like to provide the service from a portfolio of units. A stakeholder process has been initiated to address the issue, and a possible alternatives are under consideration. The change pertains only to portfolio bidding of A/S in the forward markets. The ISO has no current plans to provide for portfolio dispatch of ancillary services in real-time. These changes will require a Tariff amendment, if implemented.

(l) Portfolio Bidding of Energy and Inter-SC Trade Adjustment Bids

Portfolio bidding of energy and inter-SC trade Adjustment Bids are two more functions under consideration. Generators who do not have resources on both side of the congested path will be able to participate in congestion management through inter-SC trade adjustment bids. The effect on the A/S markets would be indirect – expanding the market by further reducing procurement of A/S by zone due to congestion.

(m) Inter-SC Trades of Ancillary Services

Current ISO rules do not allow for inter-SC trades of ancillary services. Several market participants have interests in resources that are not within their SC's portfolio. Enabling inter-SC trades of ancillary services would afford Scheduling Coordinators the opportunity to self-provide their ancillary services obligations from resources contained within other Scheduling Coordinators' portfolios. This is also under consideration. It would likely involve substantial software changes.