California Independent
System Operator Corporation

Memorandum

To: ISO Board of Governors

From: Keith Casey, Director, Market Monitoring

Date: September 2, 2009

Re: ***Market Monitoring Report***

This memorandum does not require Board action.

EXECUTIVE SUMMARY

This report provides comments and recommendations by the Department of Market Monitoring (DMM) on three issues being presented to the ISO Board of Governors (Board) by Management at the September 10-11, 2009 meeting.

- **Proxy demand resources**. We support Management's proxy demand resource (PDR) proposal as a reasonable step towards increasing direct participation of demand response in the ISO markets. However, in order to provide a reasonable level of assurance that demand reductions being paid for are actually occurring, we believe that many additional details of the program need to be developed prior to implementation. Some specific examples of these are provided below. We also think it is important that the Board and Management understand that effective administration of the PDR program will require significant resources, particularly for ongoing activities relating to verification, monitoring, assessment and potential rule modifications. We believe it is important that the responsibility for PDR monitoring and verification be clearly assigned, whether this is to a specific ISO business unit or an external entity with expertise in this area, and that sufficient resources and priority are placed on this function. Absent such a commitment, we are concerned that the credibility of the PDR program will be undermined by a lack of proper controls for ensuring that load curtailment services being paid for are actually occurring.

  We note that these concerns are based on actual experiences in other ISOs that have implemented similar programs. We strongly recommend that the ISO closely review the experiences of other ISOs and consider incorporating some of the more recent changes to these programs for improving measurement and verification of performance.

- **Proposal to modify rule limiting bids used in integrated forward market**. We support the ISO's proposal to expand the pool of bids considered in the integrated forward market (IFM) to include all bids submitted to the day-ahead market, rather than only bids from units dispatched to meet forecasted load in the market power mitigation runs that occur prior to the IFM. We believe this modification will, on balance, increase market efficiency and help prevent extreme price spikes that could occur in the IFM in cases when bid-in demand exceeds the ISO's forecast by a significant margin. One noted concern with this change is that it could potentially undermine the effectiveness of the local market power mitigation procedures by introducing additional un-mitigated generation bids to the IFM. In testing this concern through market simulations with the proposed rule change in effect, we have not found this to be an issue. Moreover, we think the potential risk of this concern is outweighed by the benefit this rule change could potentially have in avoiding system-wide price spikes that could arise if bid-in demand is substantially above the ISO load forecast.

  We were also initially concerned this modification might significantly increase the day-ahead market run times. However, ISO market software experts have indicated that any increase in market run times due to this change should be largely offset by other enhancements being implemented to reduce run times, and, therefore, this change is not expected to detrimentally affect IFM software performance.

- **Exceptional dispatches.** DMM continues to monitor and assess the volume and causes for exceptional dispatches issued by the ISO to meet reliability constraints not met through the market software. Since formation of the ISO's exceptional dispatch "strike team" in July, day-ahead exceptional dispatches have decreased significantly. This sharp decline is primarily due to two specific actions taken by the ISO: 1) waiting until after the IFM runs before making exceptional dispatches, and 2) adding certain generation capacity constraints into the residual unit commitment (RUC) process, which runs after the IFM. While the recent decline in day-ahead exceptional dispatches is a very positive development from a market standpoint, we believe that ideally the IFM should operate with the same set of constraints as the RUC process, and, thus, we recommend the ISO examine options for incorporating the reliability constraints causing exceptional dispatch into both the IFM and RUC.

  We also recommend that if the ISO finds that a particular unit is either a) routinely committed in RUC to meet a generation capacity constraint not modeled in the IFM or b) routinely exceptionally dispatched after the IFM and RUC complete, then the ISO should consider exceptionally dispatching the unit before the IFM runs going forward until there is reason to believe that the unit is either a) no longer needed for the reliability constraint that was originally driving the RUC or exceptional dispatch or b) now likely to be taken in the IFM. Otherwise, we are concerned that routinely committing additional units after the IFM runs will result in over-commitment of generation, which could depress real-time market prices and increase market uplifts.

Each of these issues is discussed in greater detail below.

Proxy demand resources

We appreciate the challenges involved in developing ways for increased participation by demand response directly in the ISO market, particularly within the constraints imposed by other aspects of California's current retail and wholesale market design. We also recognize that Management's proxy demand resource (PDR) proposal incorporates extensive stakeholder input and internal ISO consideration on how to balance the goal of encouraging increased participation by demand response with the need to provide a reasonable level of assurance that demand reductions being paid for are actually received. The key challenge in meeting this second goal is accurately establishing the baseline level of customer demand that is used to measure the demand reductions provided by PDR participants. Establishing an accurate baseline is difficult due to inherent measurement and data accuracy problems, as well as the fact that PDR participants have an incentive to "game" the baseline methodology in order to increase the estimated demand reductions for which they are paid.

We believe the PDR proposal represents a reasonable step towards increasing direct participation of demand response in the ISO markets. However, in order to provide a reasonable level of assurance that demand reductions being paid for are actually received, we believe that additional details of the program need to be developed prior to implementation. While the PDR proposal outlines some general steps the ISO will take to ensure that the baseline used to determine PDR impacts is reasonably accurate, we believe that further details of this approach should be developed prior to PDR implementation. Specifically, more emphasis should be placed on:

- Defining the specific prospective measures and processes that will be employed by the ISO to ensure the baseline used to measure PDR performance is reasonably accurate;
- Establishing more specific consequences for non-compliance with program requirements; and
- Ensuring that the ISO can quickly modify rules to address any measurement inaccuracies or "gaming" that may be identified.

We have provided several examples of how this might be done in our comments on the final PDR market design proposal.[1] We recognize that all of these additional details may not need to be specified in the ISO's PDR tariff filing, but we believe that it is important to continue to develop and specify these details in order to ensure that the PDR proposal is ultimately successful and is continually improved once it is implemented.

We have specifically noted that administration of the PDR program will be extremely data intensive and involve substantial ongoing activities relating to verification, monitoring, assessment and potential rule updates/modifications. We believe it is important that the responsibility for PDR monitoring and verification be clearly assigned – whether this is to a specific ISO business unit or an external entity with expertise and experience in monitoring and verification. The entity charged with PDR monitoring and verification should also be tasked with playing a key role in helping to refine and modify program rules in response to any gaming

[1] *Comments on Draft Final Proposal for Design of Proxy Demand Resource (PDR)*, Department of Market Monitoring, August 14, 2009.

concerns that are identified through these monitoring and verification activities. In addition, we strongly encourage Management to make sure sufficient resources and priority are given to PDR administration, monitoring and verification activities, and timely modification/enhancement of PDR market rules to address any problems or "gaming" that may be observed after program implementation.

With respect to how potential gaming might be avoided or stopped once it is observed, we recommend that the ISO rely primarily on actions that could be directly implemented by the ISO – such as modifying the details of baseline measurement rules and/or denying participation by PDR specific loads – rather than relying on any referrals of suspected gaming to FERC under federal rules prohibiting *market manipulation.* Absent clear evidence of fraudulent behavior, behavior that may be considered gaming may not be effectively mitigated by a referral under FERC anti-manipulation rules. Instead, we recommend the ISO establish its own authority to take mitigating actions if gaming is suspected.

Finally, it is important to note that the concerns being raised here are not hypothetical, but based on observed experiences from other ISOs that have implemented similar programs. For example, the PJM Interconnection's (PJM) market monitor has cited a number of deficiencies with PJM's economic demand response programs that are specifically related to determining customer base lines and has provided numerous recommendations for improving the veracity of the customer base lines and purported demand curtailments.[2] We strongly recommend that the ISO closely review the experiences of PJM and other ISOs, and consider incorporating some of the more recent changes made to these programs to improve measurement and verification of performance, as well as recommendations for future changes.

Proposal to expand pool of bids considered in integrated forward market

We support Management's proposal to expand the pool of bids considered in the integrated forward market (IFM) to include all bids submitted to the day-ahead market, rather than only bids dispatched to meet forecasted load in the pre-IFM market power mitigation runs. We support this modification for several reasons.

- First, the initial rationale for this rule was to avoid the potential for relatively high priced unmitigated bids being dispatched and setting prices in the IFM. In theory, this may occur due to a combination of two factors. First, supply resources in the IFM may be dispatched differently than in the pre-IFM runs upon which bid mitigation is based due to differences in demand and supply bids used in these runs.[3] In addition, since the IFM

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[2] *2008 State of the Market Report for PJM* (Part 1, Volume 2), http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2008/2008-som-pjm-volume2-sec2.pdf. Additional analysis and recommendations from the PJM market monitor can be found in a separate report titled "*Barriers to Demand Response in PJM*," July 1, 2009 (http://www.monitoringanalytics.com/reports/Reports/2009/Barriers_to_Demand_Side_Response_in_PJM_20090701.pdf)

[3] Specifically, the pre-IFM runs are based on forecasted demand, while the IFM is based on bid-in demand. Also, pre-IFM runs are made with unmitigated bids, while the IFM is run with mitigated bids. These differences in both demand and supply bids can result in a different mix of resources being dispatched in the IFM than in the pre-IFM runs upon which mitigation is determined.

market optimization minimizes *total bid costs*, rather than *total cost paid*,[4] there is a potential that a relatively small quantity of high priced unmitigated bids can be dispatched and set locational marginal prices in the IFM – thereby raising overall costs. In testing this concern through market simulations with the proposed rule change in effect, we have not found this to be an issue.

- Second, recent market experience has shown that in cases when the amount of load clearing the IFM exceeds the ISO's load forecast by a significant margin, the market rule limiting the supply of bids considered in the IFM has substantially decreased market efficiency and resulted in extreme price spikes. While this has occurred on a relatively small number of cases, the impact of these price spikes has nonetheless been significant. Likewise, while these price spikes may have been avoided by more price-responsive demand bids in the IFM, this rule change would still increase overall market efficiency under a wide range of scenarios.

- Finally, we were initially concerned that modifying this rule could detrimentally affect the IFM by increasing the software run times and limiting the ISO's ability to re-run the IFM software if needed. However, ISO market software experts have indicated that any increase in market run times due to this change should be largely offset by other enhancements being implemented that will reduce run times, and therefore they do not expect this change will detrimentally affect IFM software performance.

Exceptional dispatches

Exceptional dispatch is a term used to describe manual dispatches performed by an ISO operator in cases where the market failed (or was expected to fail) to address a particular reliability need. Since the start of the new market, the use of exceptional dispatches has been higher than expected, and this has raised concerns, particularly among generator owners, about the efficacy of the new market and impact these manual dispatches are having on market prices.

We have undertaken a comprehensive review of this issue, focusing on identifying the primary reasons for exceptional dispatch and what actions could be taken to reduce the need going forward. The results of this assessment are provided in a recently released *Quarterly Report on Market Issues and Performance*.[5] While the report showed a decline in the volume of exceptional dispatch in June relative to April and May, we noted an increase in exceptional dispatch in July.

Our quarterly report did not include an assessment of the market impacts from exceptional dispatch because undertaking such an analysis would require knowing the counter-factual of what prices should have been if the reliability constraints driving exceptional dispatch were incorporated into the market model. However, since most exceptional dispatches during the Aril

[4] In the ISO single price auction market design, total costs paid are ultimately a function of market clearing prices multiplied by the market clearing quantities, rather than the *bid cost* used in the market objective function, or the sum of prices of all bids dispatched.

[5] *California ISO Quarterly Report on Market Issues and Performance*, July 30, 2009 (http://www.caiso.com/23fb/23fbed164b6b0.pdf)

to June time period were limited to committing units to their minimal operating level in the day-ahead market (about 95 percent) and such minimum load energy is not eligible to set prices under any case, the market impacts of such dispatches may not be that significant.

As long as there is a well-founded reliability need for having a unit on-line, the market outcome from having the operator manually force it on in the day-ahead market may not be appreciably different than what would occur if the constraint leading to this action was in the market causing the market to dispatch the unit automatically. However, to the extent exceptional dispatches are overly conservative or the reliability criteria driving the exceptional dispatch can be met by different combinations of unit commitments, having the constraint in the market model and managed by the market optimization will likely produce a more efficient and different market outcome. In this case, prices would be different but not necessarily higher relative to the exceptional dispatch case.

Exceptional dispatches for energy above the minimum operating level of the units, which are limited to the real-time market, can distort and suppress market prices if the original market bids for this energy are at or above prevailing market prices. In this case, having the reliability constraint driving these exceptional dispatches incorporated into the market model would likely lead to higher LMPs at the location of the exceptional dispatch and the surrounding area that defines the reliability constraint. Our report noted that in May and June there were very few real-time exceptional dispatches for energy above a unit's minimum output level, and thus the current market impact from these dispatches is likely minimal.[6]

While it is unrealistic to think that exceptional dispatch can be entirely eliminated, we noted in our quarterly report that concerted efforts by the ISO in the following areas could significantly reduce the frequency of exceptional dispatch (listed in order of short to longer term efforts).

- Undertake a comprehensive review of all operating procedures and other criteria for determining the need for exceptional dispatch to make sure the criteria and processes driving exceptional dispatch are well-founded, consistently followed, and not overly-conservative.

- Explore and implement options for incorporating the reliability constraints driving exceptional dispatch into the market model.

- To the extent exceptional dispatch is being driven by the need for contingency reserves, consider new market products that might mitigate the need for exceptional dispatch and more appropriately remunerate resources providing these reserve services.

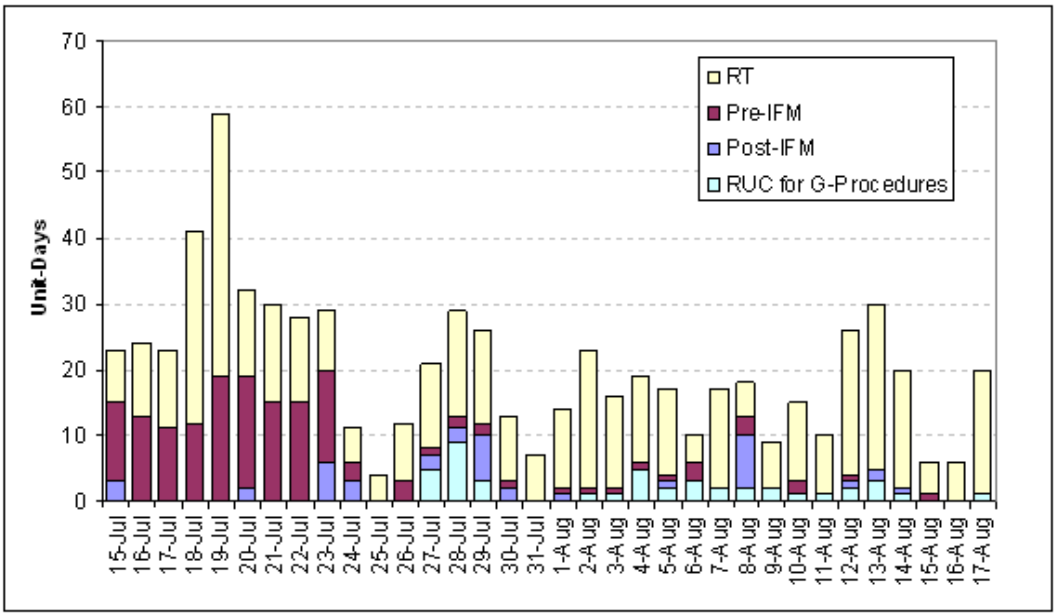
Since formation of the ISO's exceptional dispatch "strike team" in July, day-ahead exceptional dispatches have decreased significantly. This decline is evident in **Figure 1**, which shows daily frequency of exceptional dispatches, categorized by whether the dispatches were made before the IFM (Pre-IFM), after the IFM (Post-IFM) or in real-time (RT). This sharp decline is primarily

[6] More recent analysis indicates that about 51% of energy dispatched via exceptional dispatch in the real-time market was bid at prices less than the market LMP, with only about 49% of exceptionally dispatched energy having a bid price greater than the LMP.

due to two specific actions taken by the ISO: 1) waiting until after the IFM runs before making exceptional dispatches, and 2) adding certain generation capacity constraints into the residual unit commitment process, which runs after the IFM.

Figure 1 also captures the daily frequency with which units are being committed in RUC due to the enforcement of the above-noted generation capacity constraints. Since the implementation of the two above-noted changes (July 26), the combined daily frequency of units committed through exceptional dispatches and RUC are consistently much less than the previous daily frequency of exceptional dispatch unit commitments. This significant change suggests that units that were previously exceptionally dispatched prior to running the IFM (Pre-IFM) are now largely getting committed in the IFM leaving little residual need for post-IFM unit commitments through exceptional dispatch or RUC.

Figure 1. Daily Frequency of Exceptional Dispatches and RUC Commitments



While the recent decline in day-ahead exceptional dispatches is a very positive development from a market standpoint, we believe that ideally the IFM should operate with the same set of constraints as the RUC, and, thus, we recommend the ISO examine options for incorporating the reliability constraints causing exceptional dispatch into both the IFM and RUC. We also recommend that if the ISO finds that a particular unit is either a) routinely committed in RUC to meet a generation capacity constraint not modeled in the IFM or b) routinely exceptionally dispatched after the IFM and RUC complete, then the ISO should consider exceptionally dispatching the unit before the IFM runs going forward until there is reason to believe that the unit is either a) no longer needed for the reliability constraint that was originally driving the RUC or exceptional dispatch, or b) now likely to be taken in the IFM. Otherwise, we are concerned that routinely committing additional units after the IFM runs will result in over-commitment of generation, which could depress real-time market prices and increase market uplifts.

Since relatively few units are currently being committed after the IFM, we do not believe the current practice is having a material impact on depressing real-time prices. However, changes in grid conditions going forward (e.g., transmission outages) could result in a much larger number of units being committed after the IFM and this could result in an over-commitment of resources that depresses real-time prices. We also realize that in some cases issuing exceptional dispatches prior to running the IFM may be problematic if these dispatches simply displace other units from the IFM that are then required to be exceptionally dispatched or committed in RUC after the IFM. In such cases, it may be better to not exceptionally dispatch these units prior to running the IFM. Ultimately, ISO operators will need to use their judgment and experiment with the timing of exceptional dispatches to minimize the amount of unit commitments occurring after the IFM runs. In the longer-term, the ultimate goal should be to get the reliability constraints driving exceptional dispatches captured in the market model so that the market can solve these constraints and reflect them in market prices.