

Memorandum

To: ISO Board of Governors
From: Keith Casey, Director, Market Monitoring
CC: ISO Officers
Date: October 12, 2006
Re: Market Monitoring Report

This is a status report only. No Board Action is required.

EXECUTIVE SUMMARY

This memo provides review and analysis in three areas:

- Compliance with Amendment 72 scheduling and forecasting requirements during summer 2006.
- Compliance with current outage reporting requirements and proposed revisions to these requirements.
- Periodic insufficiency of Ancillary Services bids during spring and summer 2006.

A summary of the key findings in each of these areas is provided below.

Compliance with Amendment 72

- In Spring 2006, the Department of Market Monitoring (DMM) initiated a program to routinely enforce the requirement that all Scheduling Coordinators (SCs) submit Day Ahead load forecasts and weekly reports that detail each SC's daily forecast and schedule. Compliance with these forecasting and reporting requirements has been virtually 100% since May, compared to only about 75% in the first five months of 2006.
- Pursuant to FERC Order on Amendment 72, DMM also routinely provides summary reports and data to the Federal Energy Regulatory Commission's (FERC) Office of Enforcement (OE) comparing Day Ahead forecasts and schedules submitted by SCs, so that FERC staff may assess compliance with Amendment 72's 95% scheduling requirement. Compliance with the 95% Day Ahead scheduling requirement has also been very good and has improved since implementation of DMM's reporting program, with compliance at virtually 100% during peak hours.
- One of DMM's concerns with Amendment 72 has been that, since compliance with the 95% scheduling requirement is measured based on each SC's forecast load, rather than their actual load, the Day Ahead scheduling requirement could be "gamed" by simply submitting forecasts that are lower than actual expected load. However, analysis of load forecast and metered load data over the summer months indicates that the forecasts submitted by SCs were highly accurate. Although the aggregated forecast of all SCs occasionally was less than

metered loads during the highest peak days of the summer, the average aggregate forecasts submitted by SCs for the super peak hour (Hour Ending 16) has equaled or slightly exceeded actual metered loads.

Generation Outage Reporting Requirements

- Due to the importance of timely reporting of forced outages by generating units reporting on summer reliability, DMM implemented a program in advance of summer 2006 to routinely enforce the CAISO's Tariff generation outage reporting requirements, including the requirement that all generation forced outages be reported within 30 minutes and that explanations of forced outages be provided within two working days of the outage. However, as a result of market participant concerns about the existing outage reporting requirements --- and DMM's lack of discretion in enforcing these requirements --- DMM recommended that the CAISO submit a filing to FERC to temporarily suspend the associated penalties.
- On July 11, 2006, the CAISO requested that FERC temporarily suspend the CAISO's existing outage-reporting penalties so that the CAISO could initiate a stakeholder process to modify existing reporting requirements and address stakeholder concerns. FERC granted the CAISO's request and suspended the penalties through October 31, 2006. Over the past several months the CAISO has engaged stakeholders and developed a proposal that addresses their concerns. The proposed modifications are detailed in a separate memo from Outage Management. While DMM defers to Grid Operations with respect to assessing the reliability benefits of the proposed outage reporting requirements (such as time deadlines for reporting outages and the proposed minimum quantity thresholds for reporting), DMM supports the proposed modifications as workable from an enforcement perspective. The proposed modifications provide additional clarity and reduce the administrative burden associated with outage reporting, while still requiring the bulk of forced outage capacity to be reported in a timely manner.
- Timely and accurate outage reporting is critical for grid reliability, which is why the Enforcement Protocols contain significant penalties for failure to comply with the reporting requirements (i.e., penalties that can range up to \$5,000 per outage that is not reported within 30 minutes and a penalty of \$550 per day that explanations of forced outages are late). Based on recent compliance levels, unless compliance with the outage-reporting requirements improves significantly, a significant number of penalties may be incurred even under the revised requirements. DMM has little or no discretion in enforcing these penalties, and only FERC has the authority to waive or modify a penalty due to "mitigating circumstances" under the CAISO Tariff. It is important that CAISO management and the Board understand the potential cost consequences to the market for failing to meet these requirements and that effective enforcement of these provisions will require significant time and resources from DMM and critical support from other CAISO business units (i.e., Legal and Operations).

Bid Insufficiency in the Ancillary Service Markets

- The frequency and magnitude of procurement deficiencies in the Ancillary Service (A/S) Markets has been noticeably high during periods in the spring and summer of this year. The procurement deficiencies have not significantly impacted grid operations. However, on the Summer peak load day of July 24th, the CAISO did experience significant procurement shortages across the super-peak hours that contributed to real-time deficiencies in operating reserve and ultimately the dispatch of interruptible load.
- While the frequency of A/S procurement deficiency was relatively similar during the spring and summer periods studied, deficiencies were more evenly distributed across the peak and off-peak periods during the spring period compared to a higher concentration of deficiencies during peak hours during the summer period. In addition, the more severe instances of procurement deficiency occurred at higher load levels (load levels above 43,000 MW, with most occurring at load levels above 45,000 MW) during the summer period.

- DMM will perform additional analysis on available Ancillary Service capacity that was not bid into the market during bid deficiency hours and provide a more comprehensive analysis of the source of procurement deficiencies in its 2006 Annual Report on Market Issues and Performance.

I. Amendment 72 Day Ahead Scheduling Requirements

In October, 2005, the CAISO filed Tariff Amendment 72, which required Scheduling Coordinators (SCs) to submit Day Ahead Schedules equal to at least 95% of their forecast Demand for each hour of the next day. The 95% Day Ahead scheduling requirement was designed to enhance reliability and reduce the need for the CAISO to take actions to protect against underscheduling, such as requiring additional capacity to be on-line through Must-Offer Waiver denials. Amendment 72 also requires SCs to submit Day Ahead forecasts of their expected load and to make weekly submissions that compare their forecasted, scheduled, and estimated actual demand by UDC Service Area for each hour of each week. FERC approved Amendment 72 in November 2005.

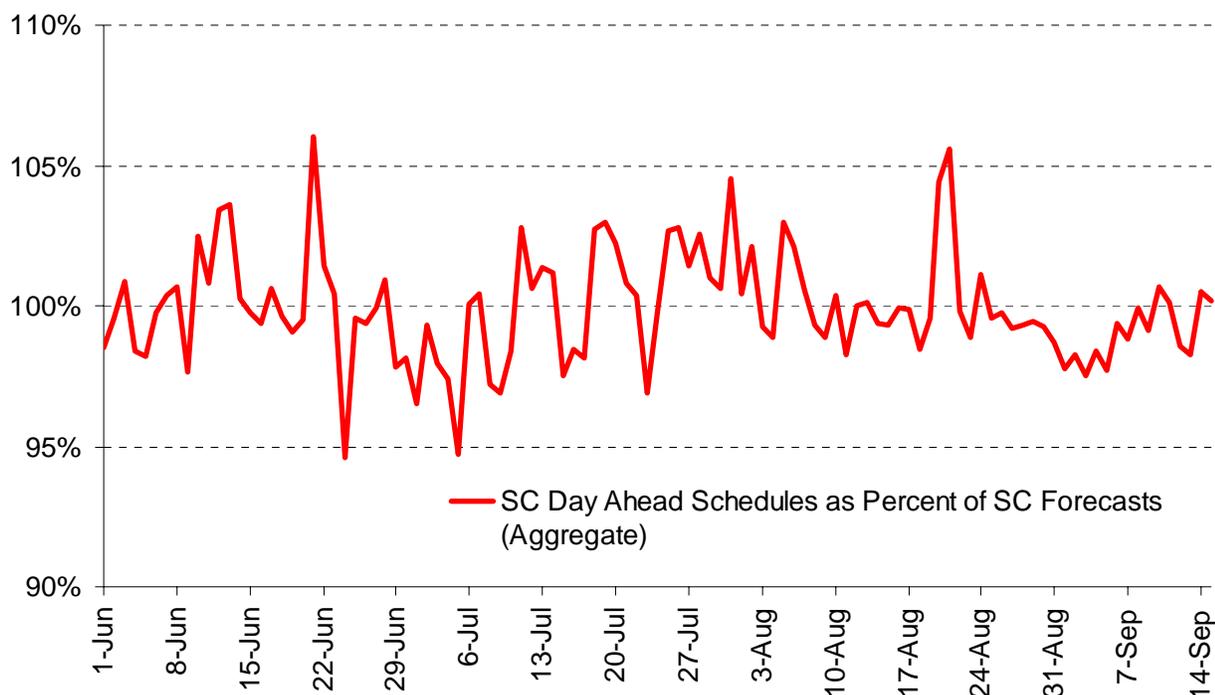
Amendment 72 explicitly provided that failure to submit Day Ahead forecast and weekly reports would be subject to sanction under the Enforcement Protocol (EP) of the CAISO Tariff, which provides for a penalty of \$500 for failure to submit required information. However, the CAISO did not seek to include a penalty for failing to meet the 95% scheduling requirement in Amendment 72, and instead indicated that any failure to meet this requirement may be subject to enforcement by FERC under FERC market rules, which include a general requirement that participants comply with all provisions of the CAISO Tariff.

As part of the 2005 CAISO realignment, DMM was assigned the responsibility of administering the CAISO Tariff Enforcement Protocol. In spring 2006, DMM initiated a program to routinely enforce the requirement that all SCs submit Day Ahead Load Forecasts and weekly reports. In addition, pursuant to the FERC Order on Amendment 72, DMM began to provide routine summary reports and data to FERC's Office of Enforcement comparing Day Ahead forecasts and schedules submitted by SCs, so that FERC staff may assess compliance with the 95% scheduling requirement.

Overall compliance with Tariff Amendment 72 provisions has been extremely high since implementation of DMM's enforcement and reporting program. Compliance with the forecasting and reporting requirements has been virtually 100% since May, compared with only about 75% in the first five months of 2006. Meanwhile, compliance with the 95% Day Ahead scheduling requirement has also been very high and has increased since implementation of DMM's program, with compliance at virtually 100% during peak hours.

This high level of compliance is reflected in Figure 1, which shows aggregate Day Ahead schedules as a percent of the aggregated forecasts of all SCs for Hour Ending 16 of each day from June 12 through September 14. This trend is further illustrated in Figure 2 and in Table 1, which show that, in aggregate, SCs have scheduled an average of nearly 100% of their Day Ahead forecasts during daily peak hours from June to September.

Figure 1 Comparison of Day Ahead Scheduling to SC Forecasts, By Day, Hour Ending 16



One of DMM's concerns with Amendment 72 is that since compliance with the 95% scheduling requirement is measured based on each SC's forecast load, rather than their actual load, the Day ahead scheduling requirement could be "gamed" by simply submitting forecasts that are lower than actual expected load. However, analysis of load forecast and metered load data over the summer months indicates that forecasts submitted by SCs are highly accurate, as shown in Figures 2 and 3.¹ On a monthly basis, the aggregate forecasts submitted by SCs during Hour Ending 16 have equaled 100 to 103% of actual metered loads, as shown in Table 1.

As shown in Figures 2 and 3, in the aggregate, SCs have a slight tendency to under forecast their load during the very high load hours. However, as shown in Figure 3 and as noted in last month's DMM report, the CAISO's forecast of system loads tends to exceed actual loads on the very highest load days during the summer.²

¹ All comparisons with aggregate metered loads of SCs are based on data through August 9, since this is the most recent date for which settlement quality load meter data were available for use in this analysis.

² It is to be expected that the CAISO's forecast of system load would exceed the aggregate SC forecast since the CAISO forecast includes transmission losses which amounts to about 3% of overall system load.

Figure 2 Comparison of Day Ahead Scheduling to SC Forecasts & Metered Loads, By Day, Hour Ending 16

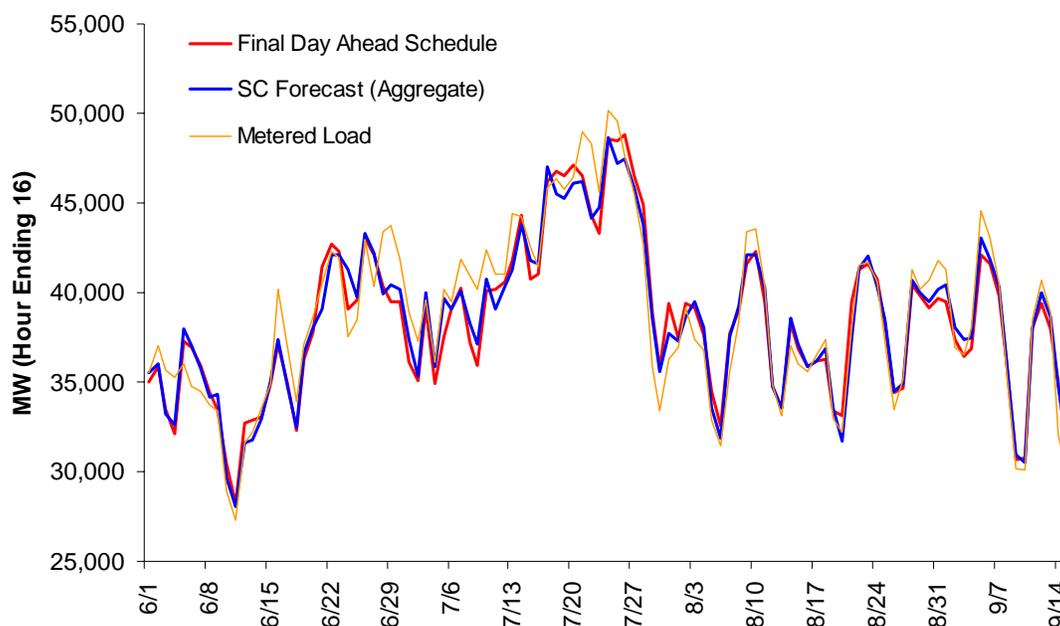
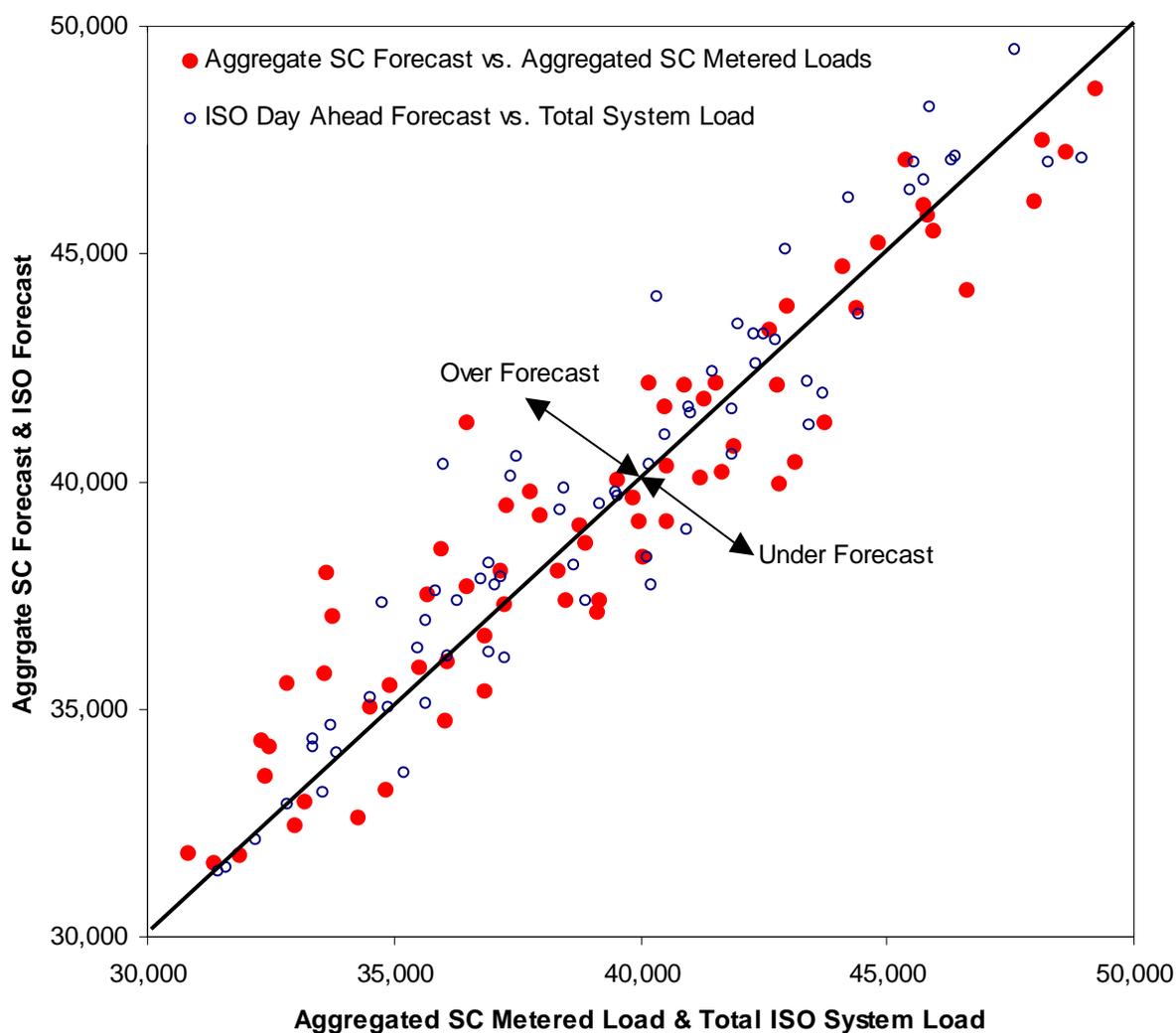


Table 1 Comparison of DA Scheduling to SC Forecasts & Metered Loads (Averages, Hour Ending 16)

	<u>Day Ahead Scheduling (As Percent of)</u>		
	SC Forecast	Metered Load	ISO Forecast
June	100%	102%	98%
July	100%	100%	98%
August	100%	103%	99%
Sept 1-15	99%	not avail.	97%

Figure 3 SC Day Ahead Forecasting Accuracy (Aggregated), June 1 – August 8, Hour Ending 16



While Amendment 72 requires SCs to schedule 95% of their forecasts, data shown in the above charts demonstrate that, in practice, most SCs schedule 100% or more of both their forecast and actual load. This suggests that other factors beyond Amendment 72 lead SCs to procure and schedule, in the CAISO's Day Ahead scheduling process, virtually all of their energy needs. For instance, this trend may be indicative of high levels of forward contracting by many or most Load Serving Entities.

Another issue that has been raised is whether there are any differences in forecasting and scheduling by CPUC-jurisdictional load-serving entities (i.e., Investor Owned Utilities) and SCs representing other load-serving entities. As shown in Table 2, there is only a slight difference between the Day Ahead patterns of these groups, with non-CPUC-jurisdictional load-serving entities scheduling approximately 100% of their energy needs on a Day Ahead basis, while CPUC-jurisdictional load-serving entities tend to slightly over-schedule relative to their forecast energy needs.

Table 2 Day Ahead Scheduling of CPUC Jurisdictional IOUs and Other SCs – Averages for All Hours With Loads Over 40,000 MW

	Day Ahead Schedule as Percentage Forecast & Metered load					
	<u>Day Ahead Forecast</u>			<u>Metered Load</u>		
	IOUs	Other	Total	IOUs	Other	Total
June	115%	108%	112%	99%	97%	99%
July	109%	103%	107%	102%	99%	102%
August 1-9	106%	101%	104%	99%	97%	99%

The CAISO's MRTU filing indicated that the Amendment 72 Day Ahead scheduling requirement was implemented as a "stop gap" measure that the CAISO expects would be unnecessary and not be extended once the Integrated Forward Market (IFM) and Residual Unit Commitment (RUC) processes were in place under MRTU. However, FERC's September 21 Order on MRTU indicated that the FERC is concerned about the potential for Day Ahead underscheduling by LSE's in the absence of convergence bidding and/or any explicit Day Ahead scheduling requirement. Consequently, the Commission's September 21 Order directs the CAISO to develop and file interim measures, no later than 180 days prior to the effective date of MRTU Release 1 to address the potential economic incentive for LSE's to underschedule in the Day Ahead market until the successful implementation of convergence bidding has been achieved.³

II. Generation Outage Reporting

Generation outage reporting requirements are incorporated in the Enforcement Protocols (EP) of the CAISO Tariff. Under these Tariff provisions, forced generation outages must initially be reported within 30 minutes and generators must provide an explanation of forced outages within two working days. Penalties for non-compliance with the requirement to report outages within 30 minutes range from \$1,000 up to \$5,000 per outage, depending on the number of violations. The penalty for not providing a forced outage explanation within two days is \$500 per day the explanation is late.

Due to the potential importance of outage reporting on summer reliability, DMM implemented a program in advance of summer 2006 to routinely enforce the outage-reporting requirements.⁴ During the initial implementation of this program, market participants expressed several concerns regarding the implementation of outage reporting penalties:

- The Tariff definition of "outage" includes "any" reduction in capacity, i.e., any "derate," which could include even infinitesimally small, normal variations of a unit's measurable capacity. Market participants contended that this

³ September 21 Order at 452 (p.132).

⁴ The roll-out process consisted of several market notices notifying market participants that the penalties for not meeting the outage-reporting requirements would be actively enforced, as well as holding conference calls and posting documents on the CAISO web site to clarify the requirements. DMM also worked with Client Services to provide market participants with lists of instances where Market Participants had apparently not met the outage-reporting requirements so that they could clearly understand the behavior that would be subject to penalties and have an opportunity to make any changes necessary to their procedures to avoid penalties.

definition would make an unreasonable number of outages subject to the Tariff outage reporting requirements and associated penalties.

- Given the frequency of small variations in unit capacity, the design of the CAISO's software application used by participants to report outages (the CAISO's Scheduling Logging ISO California or "SLIC" application) may make it difficult to report all outages within 30 minutes.
- Numerous generating units – such as small cogeneration and landfill gas facilities – are not staffed full time, and are not required to have telemetry because they have a capacity of less than 10 MW. This lack of telemetry and full-time staffing will make compliance with the requirement to report outages within 30 minutes infeasible or impractical for these units.

DMM has little or no discretion in taking these types of factors into consideration when enforcing provisions of the EP that establish specific requirements and penalties, such as those for reporting forced outages. The primary consideration in this interpretation is that while the Tariff allows penalties to be waived or modified based on "mitigating circumstances," only FERC has the authority to waive or modify a penalty under the CAISO Tariff. DMM may not unilaterally do so.

As a result of concerns about existing outage reporting requirements – and DMM's lack of discretion in enforcing these requirements – DMM did not believe that it could equitably enforce penalties for non-compliance with the Tariff outage reporting requirements, and recommended that the CAISO submit a filing to FERC to temporarily suspend the associated penalties. The CAISO filed with FERC to suspend outage reporting penalties on July 11, 2006, and was subsequently granted a four-month waiver (through October 31, 2006) for enforcement of these penalty provisions.

Shortly after filing to suspend these penalties, the CAISO initiated a stakeholder process, led by CAISO Operations, to determine an appropriate minimum MW outage reporting threshold and appropriate changes to the SLIC system. DMM supported this process by publishing a white paper that summarized key issues and data relevant to establishing the reporting requirement and represented a "straw proposal" for a reporting requirement.⁵

In its July 11 filing to FERC, the CAISO included a statement that DMM would monitor Market Participant compliance with the outage-reporting requirements and report any egregious violations to FERC. Figure 4 summarizes market participant compliance with the requirement to report forced outages within 30 minutes for June 2005 through August 2006. As shown by Figure 4, an average of about 75% of forced outages are reported within 30 minutes – a level that has remained relatively consistent over the last 16 months. There has been a similar level of compliance with the requirement to submit explanations of forced outages within two working days. However, as shown in Figure 5, there has been a slight increase in the portion of forced outages reported within 30 minutes in July and August, compared to these same months of 2005. Compliance levels for September 2006 were relatively similar to 2005. The July – August 2006 time period in particular represents the initial period that DMM's enforcement efforts were ramped up and participants' awareness of potential sanctions for failing to report outages was heightened (through communications indicating DMM's intent to enforce outage reporting penalties, or, alternatively, refer egregious violations to FERC).

At the same time, data in Figures 4 and 5 show that unless compliance with the 30-minute outage reporting deadline improves significantly, a significant number of penalties may be incurred even under the revised requirements.

⁵ See <http://www1.aiso.com/184e/184e844aa752.html>, with addendum posted at <http://www1.aiso.com/1876/1876c10b7b40.pdf>.

CAISO management's recommendation for modifying the outage-reporting requirements through a Tariff filing is provided in a separate memo to the Board. DMM supports the proposed modifications, which address the major three concerns identified by participants previously summarized in this memo. For example:

- The proposed Tariff revisions provide a clear minimum threshold for outages that must be reported (10 MW or 5% of the unit's maximum rated capacity) that avoids the administrative and technical problems with a lower reporting threshold, but still requires the reporting of the bulk of system capacity affected by forced outages.
- In addition, the commitment to implement enhancements to the SLIC application used by market participants to report outages should eliminate any concern that the design and functionality of the SLIC application is an impediment to market participants' timely reporting of outages.

Timely and accurate outage reporting is critical for grid reliability, which is why the Enforcement Protocols contain significant penalties for failure to comply with the 30-minute reporting requirement (i.e., penalties that can range up to \$5,000 per outage that is not reported within 30 minutes and a penalty of \$500 per day that an explanation of a forced outage is late). Presumably the implementation of penalties will provide an incentive for market participants to more fully comply with the outage-reporting requirements, but based on the current compliance level there is the potential that DMM will administer a significant number of penalties. As previously noted, DMM has little or no discretion in how DMM may enforce these penalties, and only FERC has the authority to waive or modify a penalty due to "mitigating circumstances" under the CAISO Tariff. In practice, DMM will need to routinely issue penalties based on objective data, such as outage reporting times recorded in the SLIC system, and may only recommend through a formal filing at FERC that the Commission waive or modify a penalty due to "mitigating circumstances." Thus, it is important that CAISO management and the Board understand the potential cost consequences to the market for failing to meet these requirements and that effective enforcement of these provisions will require significant time and resources from DMM and critical support from other CAISO business units (i.e., Legal and Operations).

Figure 4 Outage Reporting Times – June 2005 through September 2006

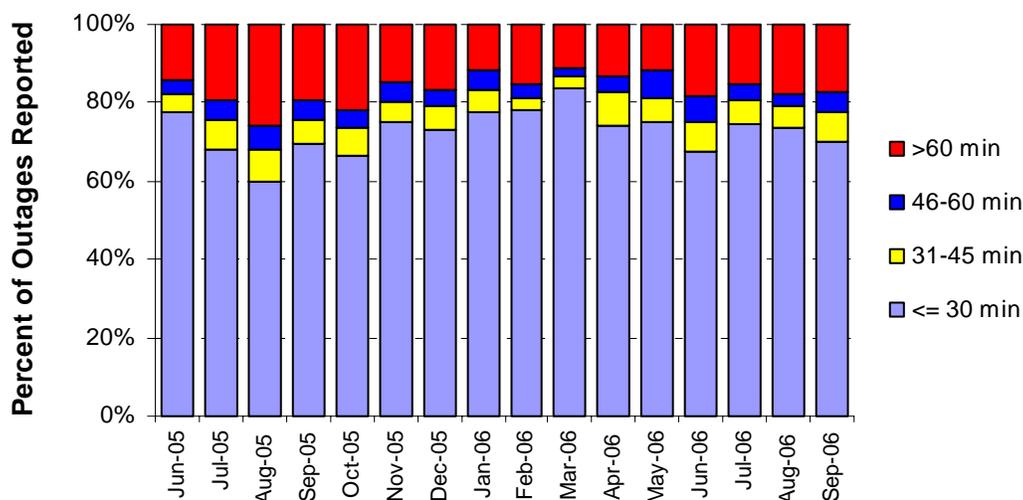
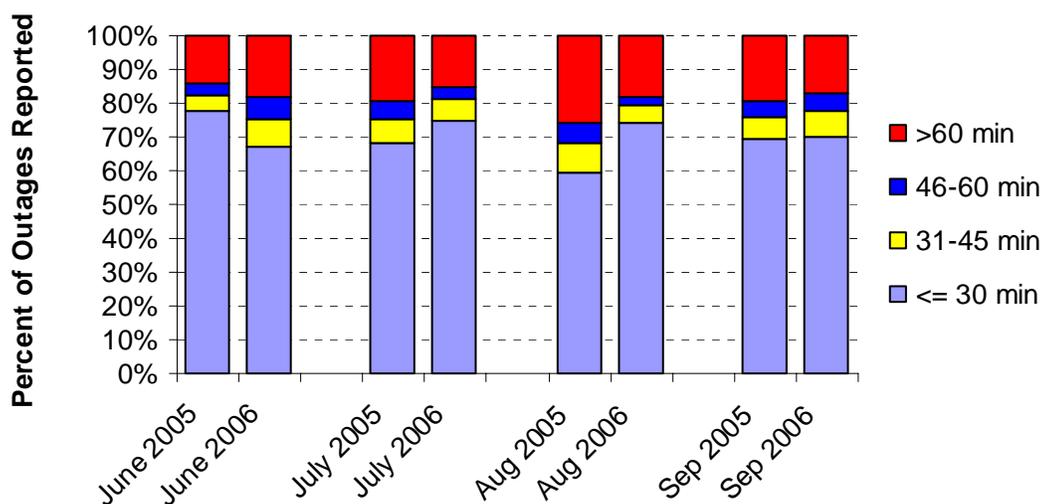


Figure 5 Outage Reporting Times – Summer 2005 and 2006

III. Bid Insufficiency on the Ancillary Services Market – Summer 2006

Beginning this past spring, the CAISO experienced an increase in the frequency of procurement deficiencies in the Ancillary Service (A/S) markets that have continued into the summer. Looking specifically at the upward services (Regulation Up, Spinning and Non-spinning Reserves), some of the procurement deficiency has been in Regulation Up, however most has been in the Spinning and Non-spinning services. Figure 6 shows the number of hours in each day where Spinning Reserve and Non-spinning Reserve procurement was collectively short of requirements. As this chart shows, the frequency of Operating Reserve deficiency was higher in May through mid-June, moderated in the later part of June through mid-July, increased during the peak of the July heat wave, and moderated substantially in August.

During the spring, high hydro conditions and resulting high hydroelectric production during this period reduced the amount of unloaded hydro capacity available for A/S. The high hydroelectric production also had the effect of displacing thermal resources that may have offered some unscheduled capacity into the A/S markets. This resulted in both a higher frequency of procurement deficiency during the spring as well as higher prices. During the early part of summer (mid-June through mid-July) bid insufficiency declined due to increasing loads resulting in more thermal capacity on-line and available to offer A/S. However, bid insufficiency increased during the extreme load conditions in the second half of July, with the most severe deficiencies occurring when loads were the highest as shown in Figure 7. With load levels moderating significantly in August (relative to July), there were very few hours of Operating Reserve bid insufficiency.

Figure 6 Frequency of Procurement Deficiency in Operating Reserves

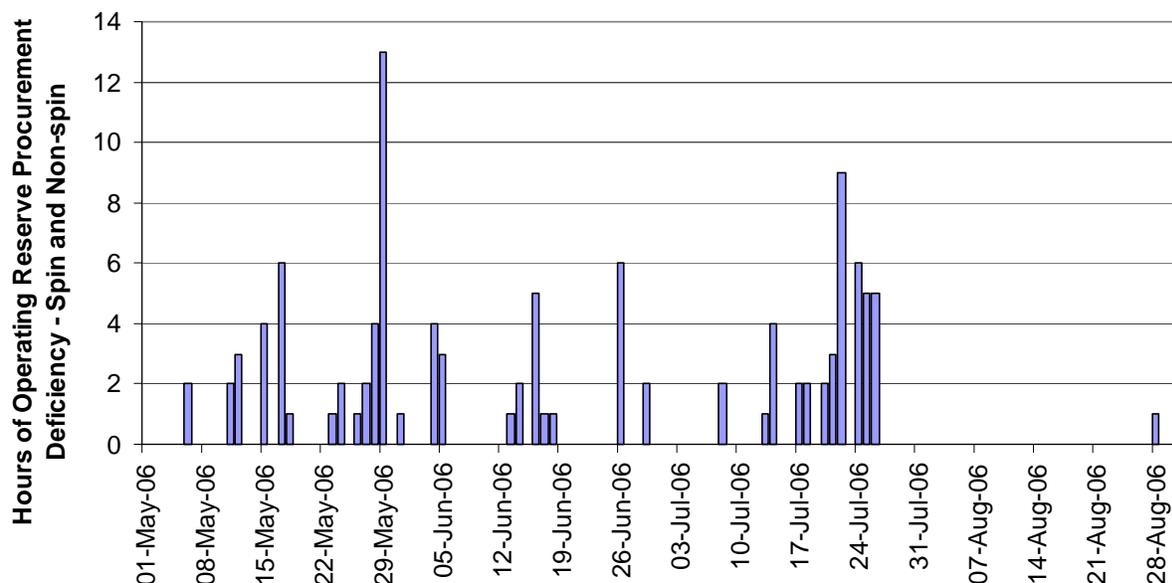


Figure 7 shows Spinning and Non-spinning Reserve procurement as a percent of requirements by hourly load level for two periods, a spring period from May 1 – June 14 and a summer period from June 15 – August 31. The frequency of procurement deficiency, as noted by procurement percentages less than 100%, is roughly equal during these two periods, however two features of the occurrence of deficiency stand out. First, during the spring period there are a significant number of hours with procurement deficiency during low-load hours, corresponding to off-peak hours, as compared to the summer period where nearly all hours of procurement deficiency occur at load levels corresponding to peak hours. Second, Figure 7 also shows that the more severe instances of procurement deficiency occur at the higher load levels (load levels above 43,000 MW with most occurring at load levels above 45,000 MW).

The pattern of peak vs. off-peak occurrence of procurement deficiency is more visible in Figure 8. Here we see that during the spring period (the top chart in Figure 8), the incidence of procurement deficiency is distributed across peak and off-peak hours whereas the procurement deficiency observed for the summer period is more concentrated in the peak hours. Though not shown on these graphs, the degree of bid deficiency was much higher during the summer period with deficiency rates reaching 25% of requirements for Spinning and Non-spinning Reserve (compared to 5% - 15% for the spring period).

Figure 7 Operating Reserve Procurement Deficiency by Hourly Load Level for Two Periods: May 1 – June 14 and June 15 – August 31

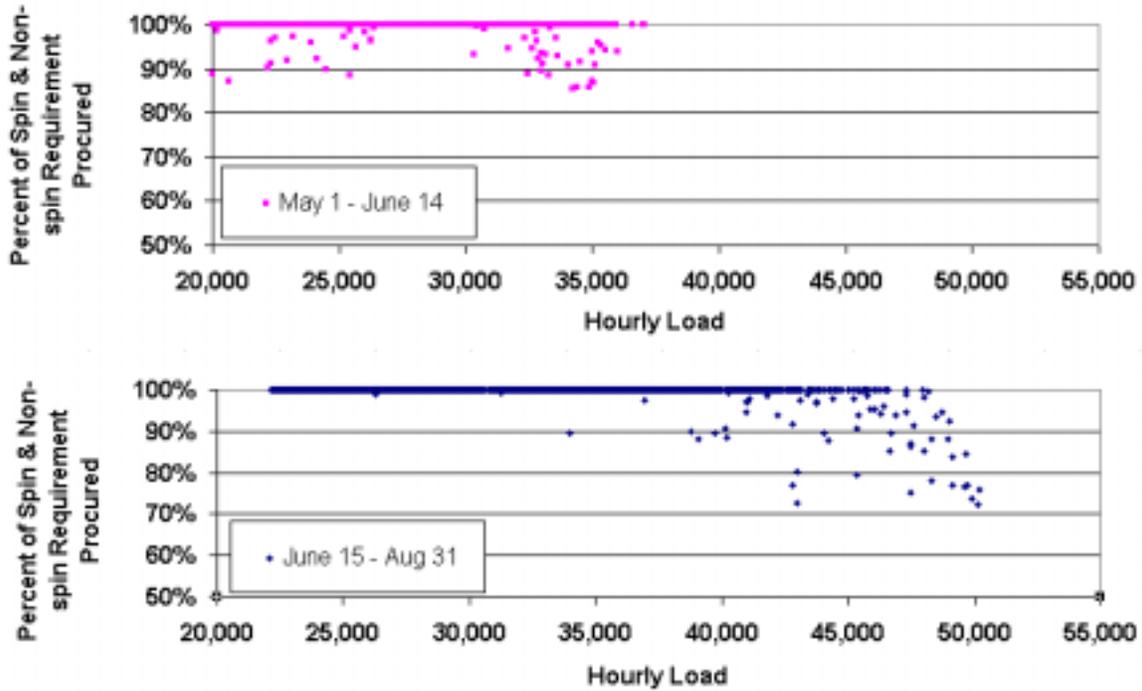
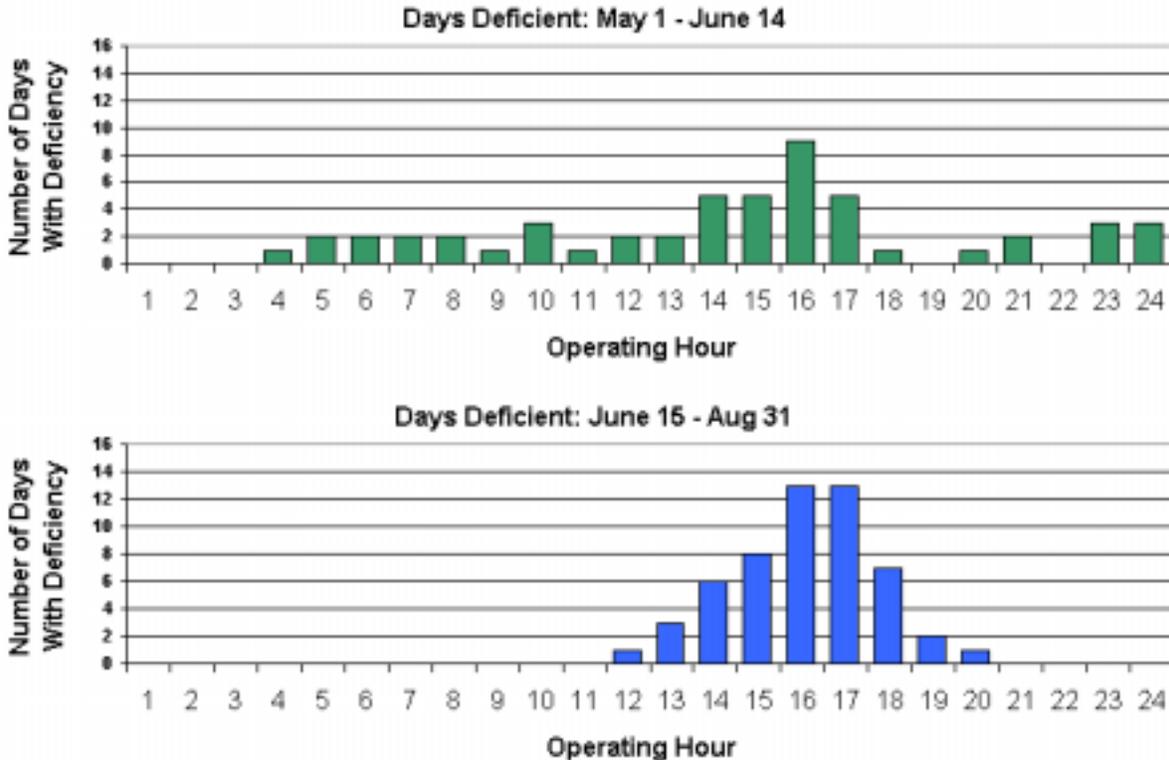


Figure 8 Frequency of Operating Reserve Procurement Deficiency by Hour for Two Periods: May 1 – June 14 and June 15 – August 31



While infrequent procurement deficiencies of relatively low magnitude can be worked around through the use of Regulation Reserve, more frequent or sustained periods of relatively high procurement deficiency can pose reliability issues. Fortunately, the procurement deficiencies observed this year have not resulted in severe operating consequences. However, on the peak load day of July 24th, the CAISO did experience significant Operating Reserve procurement shortages across the super-peak hours that contributed to real-time deficiencies in operating reserve and ultimately the dispatch of interruptible load – though given the extraordinary peak load levels for that day, it was not surprising that a reserve deficiency occurred.

It is important to note the two distinct functions that Operating Reserve serves in maintaining grid reliability: 1) to serve as 'back-up' capacity to be used in the event of a severe contingency, such as the loss of one or more large internal resources or the loss of a major transmission line; and 2) to serve as reserve capacity to be used in the event that system resources (internal generation and imports) are not sufficient to meet load. During the peak load days in July, and specifically on the peak load day of July 24, 2006, the low real-time Operating Reserve levels (near 5% of load rather than the preferred 7% of load) that resulted from procurement deficiencies were manageable, although certainly not optimal. DMM will perform additional analysis on available Ancillary Service capacity that was not bid into the market during deficient hours and provide a more comprehensive analysis of the source of procurement deficiencies in its 2006 Annual Report on Market Issues and Performance.