Attachment Q

THE UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

San Diego Gas & Electric Company, Complainant,	)	
v.	)	**Docket No. EL00-95-045**
Sellers of Energy and Ancillary Services Into Markets Operated by the California Independent System Operator and the California Power Exchange, Respondents.	)	
Investigation of Practices of the California Independent System Operator and the California Power Exchange	)	**Docket No. EL00-98-042**

AFFIDAVIT OF TOM SIEGEL CONCERNING THE IMPORTANCE OF REDUCING GENERATORS' DEVIATIONS FROM SCHEDULED AND INSTRUCTED ENERGY

1. My name is Tom Siegel. I am employed by the California Independent System Operator ("ISO") as the Manager of Operational Compliance. My business address is 151 Blue Ravine Road, Folsom, California 95630.
2. Since joining the ISO over three years ago, I have worked in the Operations Engineering and the Compliance Departments. In the Compliance Department, I have worked extensively to develop tools to verify whether market participants are fulfilling their obligations as defined in the Tariff or various other agreements with the ISO. I have taken a lead role in the development, implementation and performance monitoring of the ISO demand response programs in 2000 and 2001. Finally, I have been actively involved in ensuring that compliance concerns

are adequately considered and incorporated in the development of market design changes.

3. I hold a Bachelor of Science in Electrical Engineering and a Master of Science in Electrical Engineering degree from Ohio University. Both of my degrees focused extensively on Power Systems Engineering. Prior to joining the ISO in 1999, I worked for two years in the Transmission Planning and Operations and Engineering Departments of Pacific Gas & Electric Company (PG&E). My responsibilities included Transmission Planning and Operations Engineering. Prior to joining PG&E in 1997, I worked for more than seven years in the Transmission Management Department of PECO Energy Company, where my responsibilities included Transmission Planning. While at PECO, I was actively involved in the development of the PJM market.
4. The purpose of this declaration is to identify the problems that occur when generators deviate from dispatch instructions and to support the imposition of penalties on generators that undertake excessive uninstructed deviations. As shown in this declaration, uninstructed deviations are prevalent in the ISO's Energy market. The penalties proposed by the ISO will provide incentives necessary to promote an efficient Imbalance Energy market. Penalties for excess uninstructed deviations will help ensure more predictable real time performance and price signals while discouraging physical withholding.
5. The ISO is proposing to implement penalties for the following types of uninstructed deviations: (1) declining an ISO dispatch instruction; (2) accepting an ISO dispatch instruction but deviating from it by more than a pre-defined

tolerance band; and (3) deviating from a final hour ahead schedule without being instructed by the ISO. Declining real time dispatch instructions is a serious form of physical withholding. The ISO proposes to treat declined instructions as accepted instructions that are not delivered unless the resource in question undergoes a forced outage and the Scheduling Coordinator so notifies the ISO in time. As proposed by the ISO, the penalty for positive uninstructed deviations will be the quantity of Uninstructed Imbalance Energy in excess of the tolerance band multiplied by a price equal to100% of the applicable BEEP Interval Ex Post Price. The practical result is that a supplier will not be paid for Energy in excess of the tolerance band. The penalty for negative uninstructed deviations will equal the amount of Uninstructed Imbalance Energy below the tolerance band multiplied by a price equal to 50% of the applicable BEEP Interval Ex Post price. The practical result is that negative Uninstructed Imbalance Energy will be charged at 150% of the applicable BEEP Interval Ex Post price. The ISO proposes a tolerance band equal to the greater of 5 MW or 3% of the maximum operating limit of the resource.

6. Between June 21, 2001 and March 31, 2002, the average monthly rate of declined Dispatch Instructions ranged between 3.11% and 14.08%, as summarized in Figure 1.[1] The ISO expects generators to deliver Energy in accordance with their bids. Declining an Instruction essentially has the same

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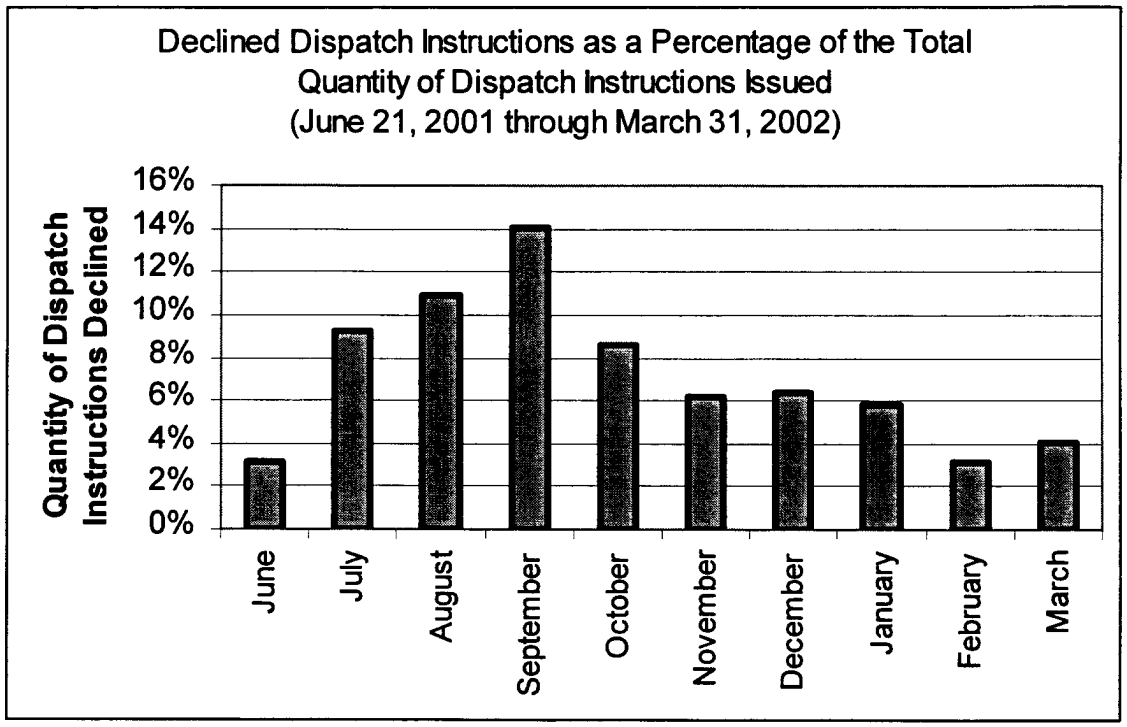
[1] The rate of declined dispatch instructions is calculated excluding instances in which Dispatch Instructions were issued for generating capacity that was unavailable, and also excluding a number of Dispatch Instructions issued for very small amounts of MW based most often upon inconsistencies between data for units' maximum generation capacities and the actual operational capacity at any given time.

impact on the ISO and the market as accepting an Instruction but not delivering the full amount of instructed Energy.

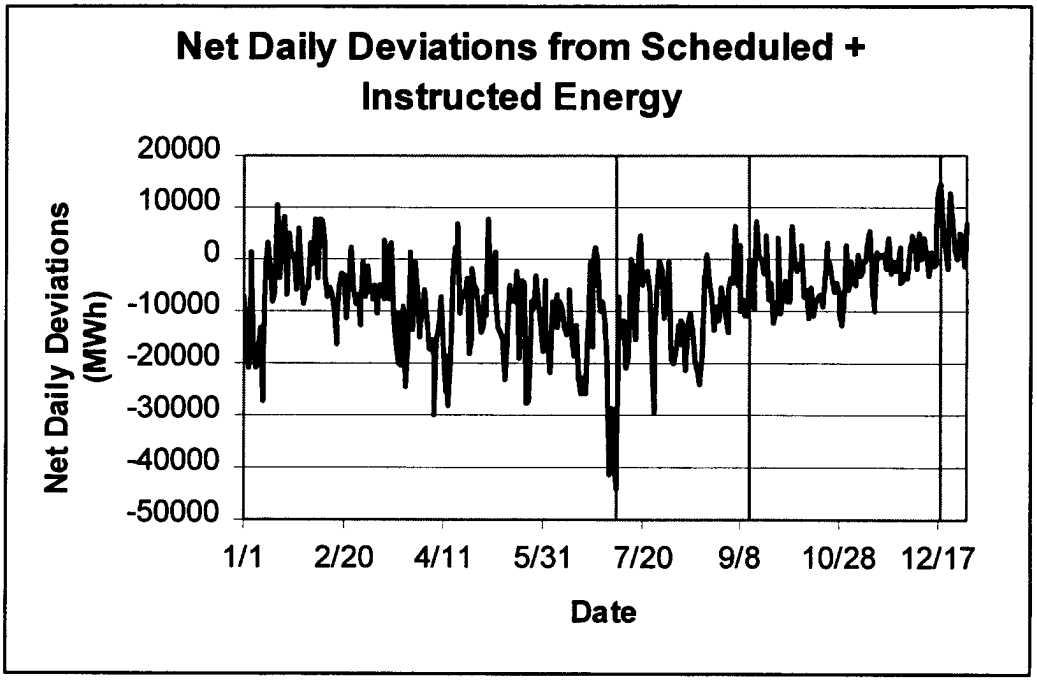
Figure 1: Rate of Declined Dispatch Instructions for June 21, 2001 through March 31, 2002.



7. The ISO also monitors generators by comparing the Energy delivered with the Energy expected based on Schedules and accepted Dispatch instructions. Figure 2 shows for 2001 deviations from forward Energy Schedules, as modified by ISO Dispatch instructions, aggregated over all of the non-regulating generating units for all hours of the day. The calculation illustrated in Figure 2 identifies a deviation any time that the actual metered generation differs from the expected Energy based on Scheduled Energy plus Instructed Imbalance Energy. For example, if a generator is scheduled to deliver 100 MW and has received Dispatch instructions for an additional 50 MW, but is found to have delivered 140 MW, the calculation illustrated in Figure 2 would indicate a -10 MW deviation for

that generator. It should be noted that this calculation differs from the calculation of uninstructed deviations under the current ISO settlements process. In that regard, the ISO currently pays Instructed Imbalance Energy on an as-delivered basis, so failure to deliver Instructed Imbalance Energy is not settled as an uninstructed deviation. As a result, the current process only produces an uninstructed deviation if the actual metered generation exceeds the total Scheduled plus instructed Energy, or is less than the Scheduled Energy. Thus, with respect to the foregoing example, the current settlement process would not indicate that any uninstructed deviation has occurred.

Figure 2: Net Daily Deviations from Scheduled plus Instructed Imbalance Energy

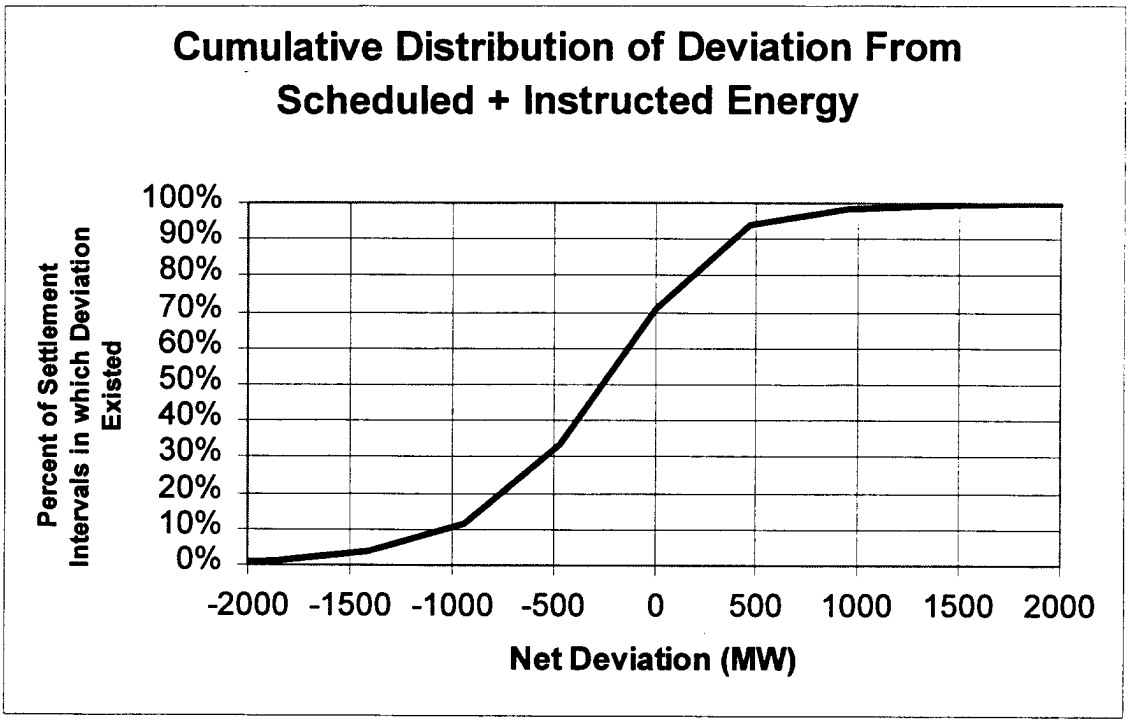


8. Although Figure 2 indicates that deviations vary significantly even from one day to the next, there is a discernable trend to the data. The chart clearly shows systemic underperformance with respect to the Energy that would be expected under Schedules and accepted Dispatch Instructions. An analysis of the data in

Figure 2 indicates that, in every month except December, the mean of all net daily deviations was negative. Figure 2 indicates that this tendency to under-deliver is more pronounced during the summer period than during the winter period. Over-delivery may occur at any time of the year but is more likely to occur in the fall and winter than in the spring and summer. In other words, suppliers are more likely to over-deliver Energy during periods with lower Demand and under-deliver Energy during periods of higher Demand.

9. When taken in aggregate, generators tend to under-deliver what is expected based on their Scheduled Energy plus ISO Dispatch instructions. Figure 3 demonstrates that in more than 70% of the settlement intervals in 2001, the aggregate deviation of generators in the ISO Control Area was negative. Furthermore, aggregate under-deliveries exceeded 1,000 MW in about 10% of the settlement intervals and 500 MW in more than 30% of the settlement intervals. However, aggregate over-deliveries exceeded 500 MW in only about 6% of the settlement intervals and 1,000 MW in just 1% of the settlement intervals. This clearly indicates that there was a very dominant tendency to under-deliver relative to the forward Energy Schedules as modified by ISO Dispatch instructions. For 2001, the aggregate Energy (netting across all resources and all intervals of the year) that was undelivered relative to the forward schedules as adjusted by ISO Dispatch instructions was 2,600 GWh. The tendency to under-deliver drives prices higher than they otherwise would be.

Figure 3: Duration Curve of Deviation from Scheduled plus Instructed Energy



10. For the ISO to successfully perform its role of Control Area operator, it is essential that generators follow forward schedules and respond to ISO Dispatch instructions in an accurate, timely and predictable manner. Failure of generators to produce Energy in a manner consistent with their forward schedules, as adjusted by ISO Dispatch instructions, can adversely impact the ISO's ability to operate the Control Area in a manner consistent with standards established by NERC and WSCC and Good Utility Practice. Additionally, if generators deviate from their expected operating points in a manner that contributes to transmission overloads or otherwise adversely affects the transmission system, the ISO's ability to manage inter- and intra-zonal congestion is adversely affected. In addition, uninstructed positive deviations may result in excess and unneeded Energy, an inefficient Dispatch of resources in the Imbalance Energy market and

inappropriately low market prices. Declining dispatch instructions or under-delivering Energy may result in a failure to supply needed Energy, an inefficient Dispatch of resources in the Imbalance Energy market and inappropriately high market prices. The problems caused by uninstructed Deviations are demonstrated in the examples discussed below.

11. Based on Figure 2, I have identified five dates in 2001 to illustrate the impact of deviations on the ISO control area - July 7, August 2, September 12, September 13 and December 18. These dates represent three examples of days with large negative net deviation, as well as the day with the net deviation closest to zero, and the day with the largest positive net deviation.

12. July 7, 2001 represents the day on which the largest negative net daily deviation (-43,867MWh) from Scheduled plus Instructed Energy was observed. Figure 4a illustrates the aggregate deviations from forward schedules, as modified by ISO Dispatch instructions, compared to the Ex-Post price in each interval of the day. Throughout the day, generators were significantly under-delivering relative to the Energy that they were expected to deliver. Even as the prices were rising gradually toward the Mitigated Market Clearing Price Limit, generator under-deliveries were still increasing. The rate of under-delivery grew to a maximum of about 3,000 MW from 1130 hours through 1700 hours and the Ex-Post price throughout that time was at or very near the Mitigated Market Clearing Price Limit. The high prices cannot be attributed to any shortfall in generating capacity. The ISO did not experience any reserve deficiency and did not even declare a warning notifying the market it expected a capacity shortfall. The high imbalance

energy prices on this day are apparently the result of generators under-delivering on their scheduled Energy as modified by ISO Dispatch instructions. Figures 4b and 4c also provide examples of days in which under-delivery of scheduled Energy, as modified by ISO Dispatch Instructions, resulted in higher prices than would otherwise have occurred.

Figure 4a: Deviation from Scheduled + Instructed Energy on July 7, 2001

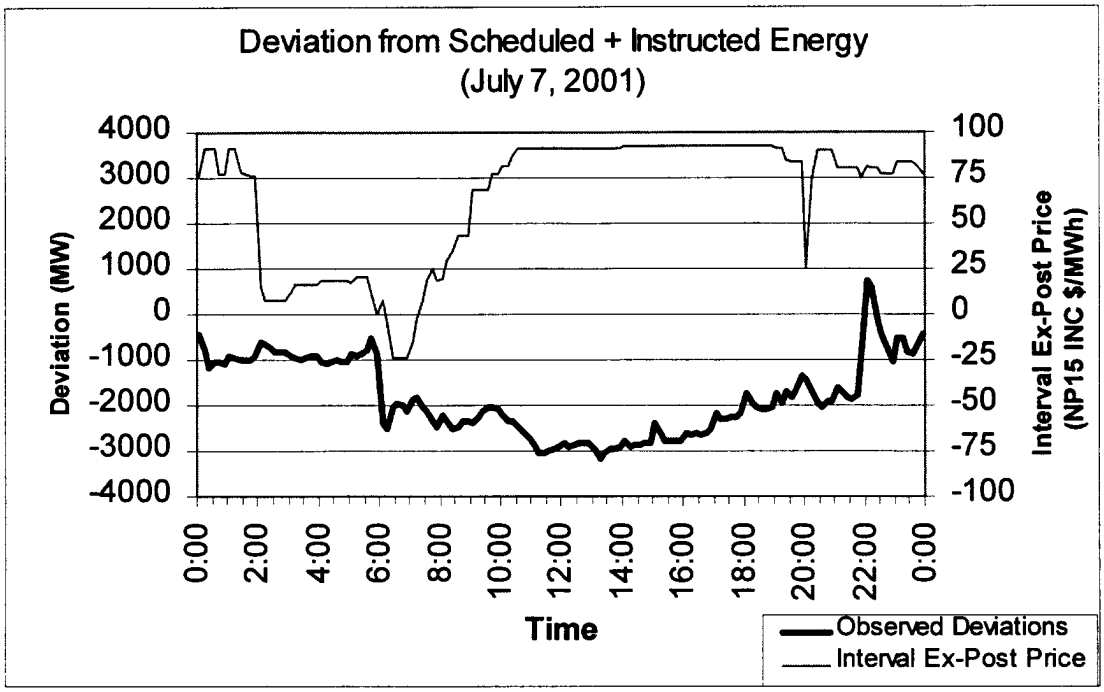


Figure 4b: Deviation from Scheduled + Instructed Energy on August 2, 2001

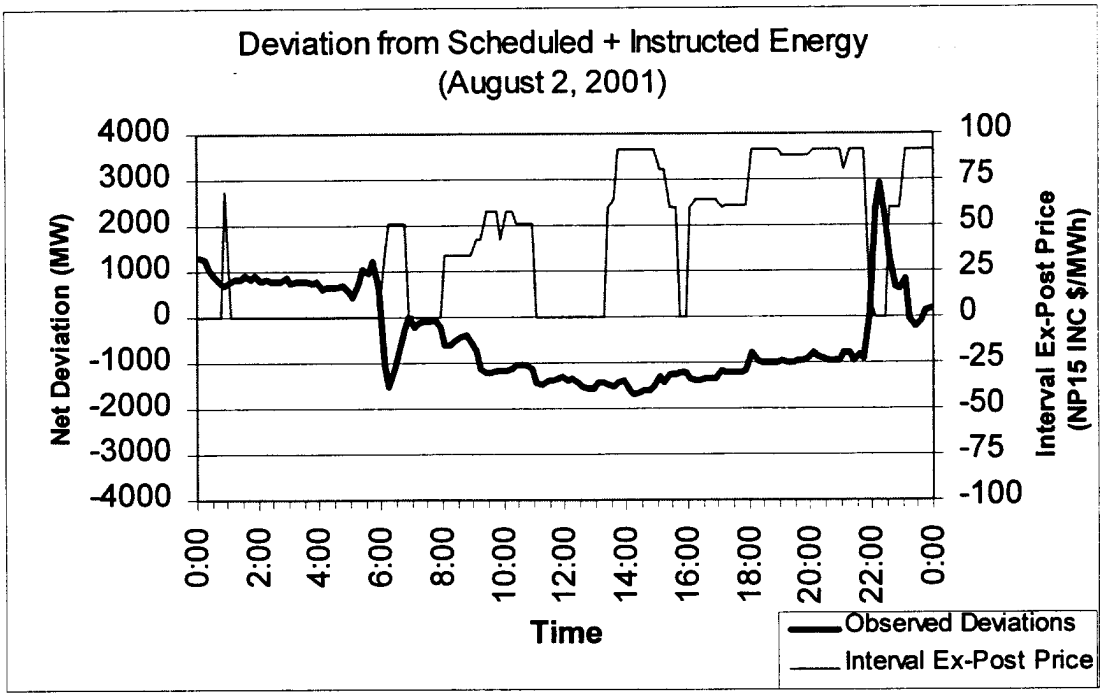
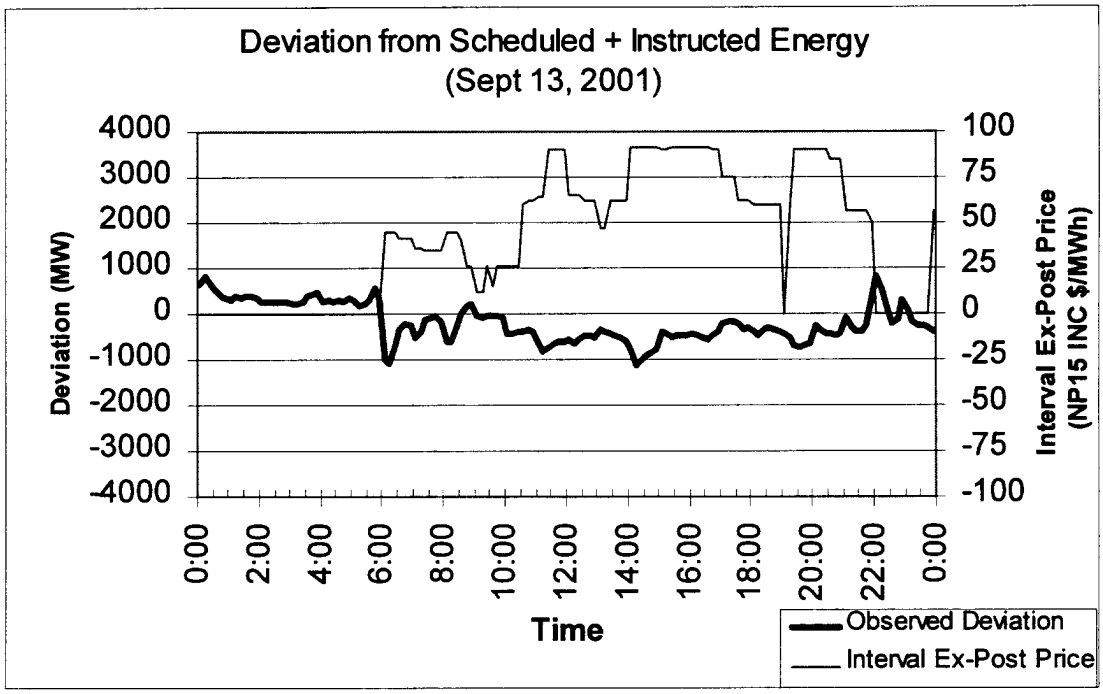


Figure 4c: Deviation from Scheduled + Instructed Energy on September 13, 2001



13. September 12, 2001 represents the day in 2001 in which the aggregate deviations from forward Energy Schedules, as modified by ISO Dispatch instructions, were closest to zero. As illustrated in Figure 5a, significant negative deviations may be offset by positive deviations. In aggregate across all intervals on September 12, 2001, the deviations totaled just 31 MWh. The spikes in deviations that occur at 6:00 and 22:00 are the result of 16-hour bilateral contracts for which generators submit changes in inter-hour Energy schedules that are infeasible based on the maximum ramp rate of the generator. Even on this day in which the net deviation Energy was closer to zero than on any other day in 2001, there still were very large deviations, both negative and positive, during different intervals. When deviations change rapidly, the resources providing regulation must move off of their Preferred Operating Point to compensate. Such deviations, however, were not limited to September 12, 2001. Figure 5b represents the average deviation that occurred in each settlement interval in 2001. The approximately 500 MW band around the average deviation defines the range of data that is within only a single standard deviation of the average. Such a massive standard deviation demonstrates that generators' responses to ISO Dispatch instructions often are unpredictable. The unfortunate consequence of such unpredictable and inconsistent response is an increased reliance on Energy from generators providing regulation and the need for the ISO to procure increased quantities of regulation. The need for additional regulation results in higher costs and increased wear and tear on more generating units.

Figure 5a: Deviation from Schedule + Instructed Energy on September 12, 2001

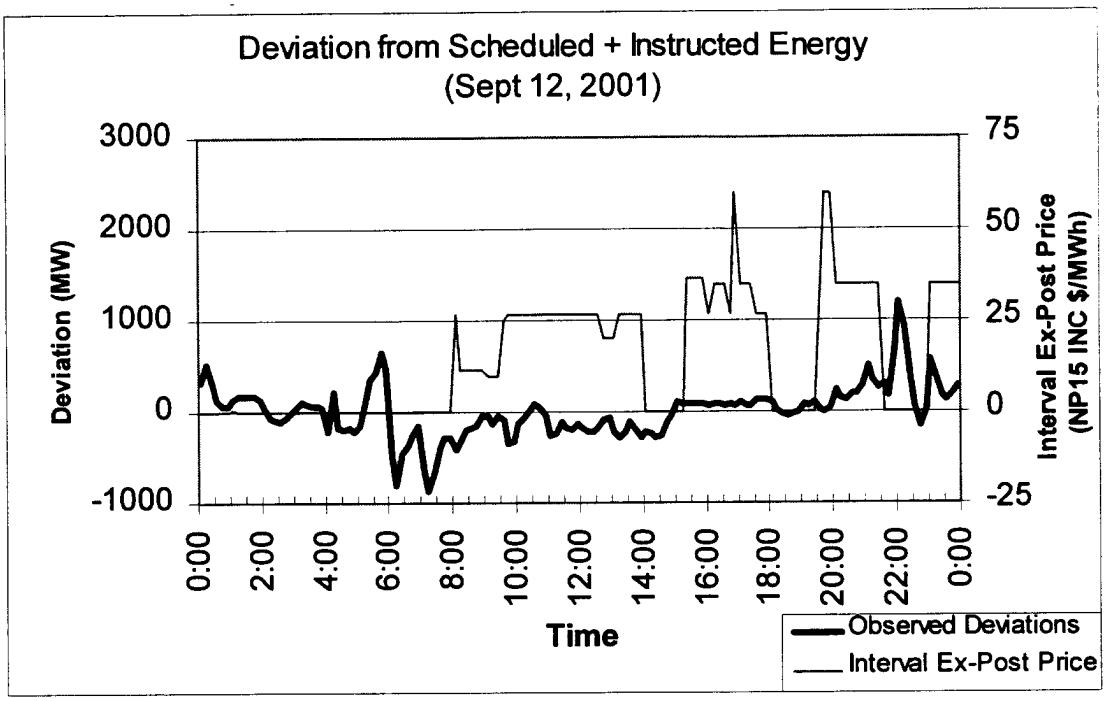
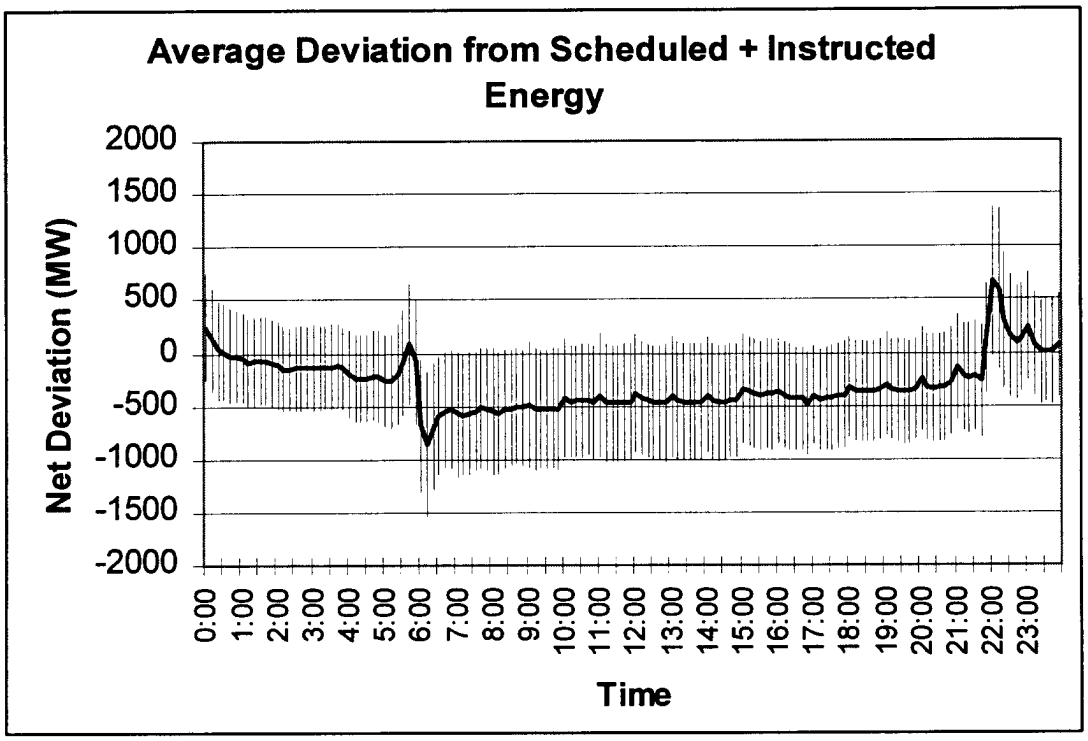
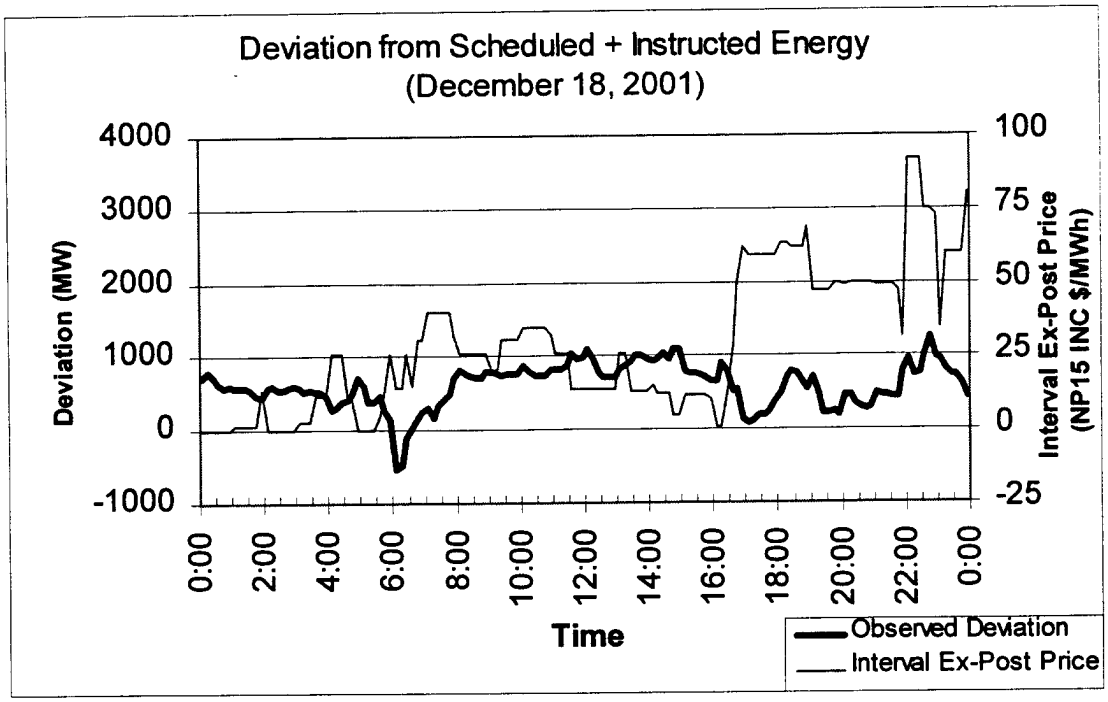


Figure 5b: Average Deviation from Schedule + Instructed Energy in 2001



14. December 18 represents the day in 2001 in which there was the greatest over-delivery of Energy from generators as compared to forward Energy Schedules as modified by ISO Dispatch instructions. The aggregate over-delivery for the day was almost 14,500 MWh. The only time that there was a period of under-delivery was just after 0600, i.e., at the start of the 16-hour contract period. In fact, the excess power delivered to the ISO Control Area was generally between 700 and 1,000 MW from about 8:00 until about 16:00. During this time the BEEP Interval Ex-Post Price gradually dropped from $40/MWh to $0.49/MWh and yet the excess generation continued to be delivered unabated. One consequence of the excess generation delivered throughout the day was to suppress the Imbalance Energy prices. So just as under-delivery generally tends to increase the Imbalance Energy price above what it would be if generators followed their schedules and instructions, thereby driving up market costs, over-delivery tends to decrease the Imbalance Energy price below what it would be if generators followed their schedules and instructions, thereby increasing the likelihood that suppliers will not recover their costs.

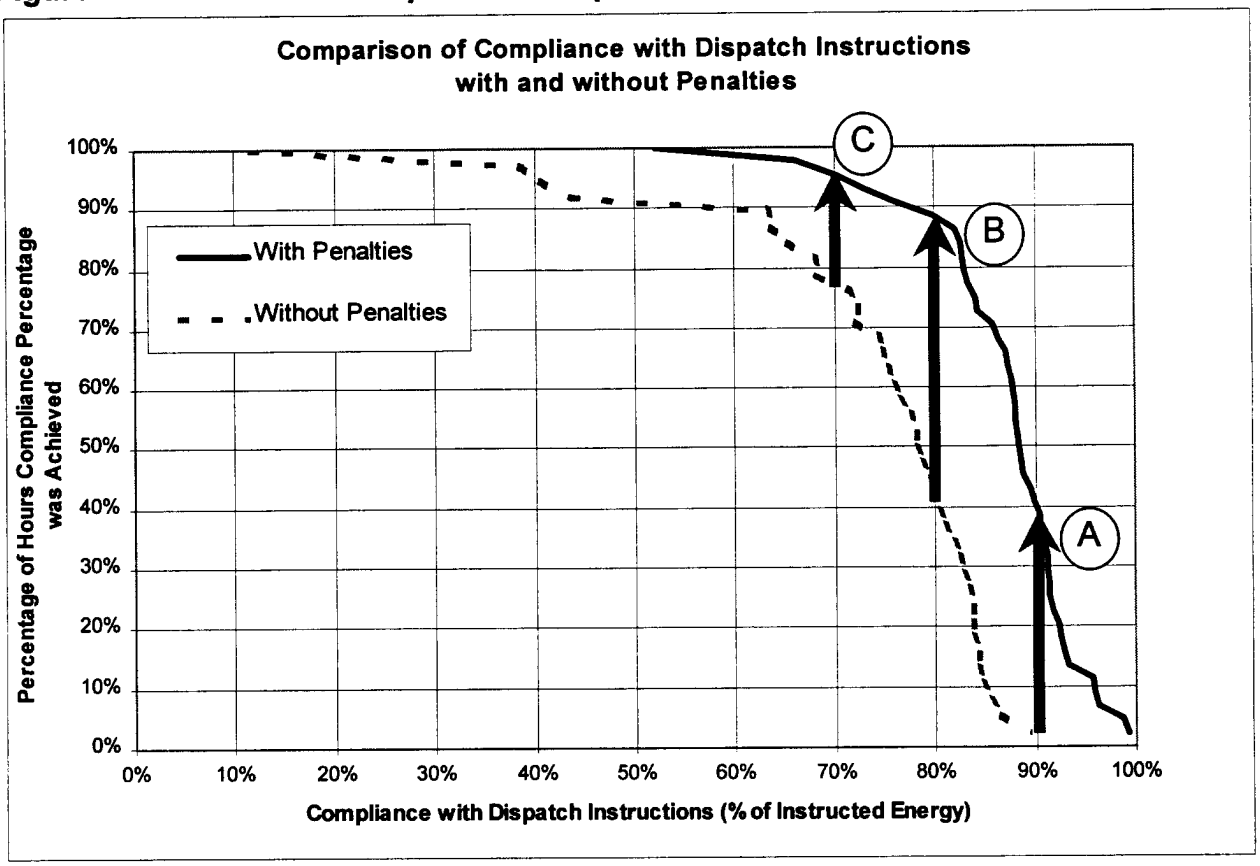
Figure 6: Deviation from Schedule + Instructed Energy on December 18, 2001



15. I believe that it is appropriate and necessary to impose penalties on generators to deter uninstructed Deviations. On December 8, 2000, the Federal Energy Regulatory Commission issued an Order in Docket No. ER01-67 approving the ISO's Tariff Amendment No. 33, that provided, in part, for significant penalties on generators that do not comply with ISO Dispatch instructions during System Emergencies. The ISO Compliance Department has conducted an analysis comparing generator compliance with ISO Dispatch instructions in System Emergencies when penalties were assessed for non-compliance to compliance during System Emergencies when no penalties were assessed. Specifically, the analysis compared emergency hours in which the ISO instructed only Incremental Imbalance Energy between April 2, 2001 and July 3, 2001 to emergency hours in which the ISO instructed only Incremental Imbalance Energy when no penalties were assessed between November 13, 2000 and December

7, 2000. The analysis was conducted using settlement quality meter data as provided to the ISO, and the results are shown in Figure 7.

Figure 7: Penalties have Improved Compliance with Dispatch Instructions



16. As indicated in Figure 7, compliance with Dispatch Instructions significantly increased during the hours in which penalties were assessed for non-compliance, as compared to those hours in which no penalties were assessed. The arrows shown on Figure 7 indicate the extent to which performance improved. Arrow A shows that generators provided 90% or more of the Energy expected from ISO Dispatch instructions only 3% of the time in hours that penalties were not imposed, but they provided at least 90% of expected Energy 43% of the time in hours in which penalties were assessed. Similarly, Arrow B

shows that generators provided at least 80% of the Energy expected from ISO Dispatch instructions only 42% of the time when no penalties were assessed, compared to 89% of the time when penalties were applied. Arrow C shows that generators provided at least 70% of the Energy expected from ISO Dispatch instructions in 95% of the hours that penalties were assessed, as compared to 76% of the hours in which no penalties were assessed. This improved performance strongly suggests that penalties promote compliance with ISO Dispatch Instructions.

17. The ISO has carefully designed its penalty proposal so that the level of penalty is specifically targeted to the particular type of uninstructed Deviation. Further, the ISO's proposal will permit generators to deviate from their instructed operating point by a reasonable amount without incurring a penalty. The ISO's tolerance band is tailored to serve its purpose, i.e., deter excessive uninstructed Deviations, while permitting a reasonable amount of operational flexibility. Specifically, the ISO's proposal accommodates unintentional deviations that result in the course of unit operations but is sufficiently stringent to provide incentives for generators to submit bids, follow instructions and maintain expected unit output.

18. With respect to the ISO's proposal that generators not be paid for positive uninstructed deviations, it is just and reasonable that market participants not be required to pay for Energy and services that the ISO did not request and which the ISO may not need. If there is a real need for additional Energy to meet the needs of the ISO Control Area, it is the ISO's exclusive responsibility to issue

Dispatch instructions to meet that need in the most efficient manner possible. Further, it is appropriate that some penalty beyond the cost of replacement Energy be imposed on a unit for under-delivering expected Energy. Without such a penalty, a supplier with a portfolio of generating units could otherwise profit unfairly by failing to deliver the expected Energy from one unit, thereby driving up the market clearing price which can be recovered by its other generating units. As I have indicated herein, when generators under-deliver scheduled and dispatched Energy, the market clearing price generally increases. Because the ISO proposes to deem Dispatch instructions to be delivered, the unit that fails to deliver will be paid the market clearing price for the amount of Energy in its Dispatch instruction and charged the market clearing price for the amount of Energy it fails to deliver. Without the penalties proposed by the ISO, if the unit is dispatched but delivers less than is expected, the payments and charges could completely offset each other. However, because the ISO may still require the Energy that is not being delivered, the ISO may be forced to call on the next bid in merit order in the BEEP Stack, thereby raising the market clearing price. To provide an incentive for generators to comply with their Dispatch instructions and to encourage an efficient dispatch of the resources supplying Energy to the market, the ISO is proposing an appropriate penalty.

County of Sacramento
State of California

By: _____

Print Name: Thomas A. Siegel

Subscribed and sworn before me on this 29 day of April, 2002

_____
Notary Public

My Commission Expires: July 20, 2004

PHAT MYERS
Commission # 1271220
Notary Public - California
Sacramento County
My Comm. Expires Jul 20, 2004