Index of Relevant Material

Submitter (Party Name)	California Parties
Index Exh. No.	CA-354
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Document Title	Prepared Rebuttal Testimony of Philip Hanser on Behalf of the California Parties
Document Author	Philip Hanser
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Specific finding made or proposed	Market fundamentals do not explain the excessive prices charged by sellers in the ISO and PX markets during the period May 1, 2000 – June 20, 2001. Sellers engaged in arbitrary markups over costs during periods of declared ISO emergencies. Sellers withdrew units during emergency periods without a mechanical or cost basis.
Time period at issue	b) between 10/2000 and 6/2001
Docket No(s). and case(s) finding pertains to *	EL00-95 and EL00-98 (including all subdockets)
Indicate if Material is New or from the Existing Record (include references to record material)	New
Explanation of what the evidence purports to show	Hockey stick bidding is neither a legitimate bidding strategy, nor is it necessary to recover investment costs. Bidding at price cap during shortages is not scarcity pricing. The econometric analysis of outages in the testimony of Harvey and Hogan suffers from various significant problems that make their conclusions questionable.
Party/Parties performing any alleged manipulation	Reliant

* This entry is not limited to the California and Northwest Docket Numbers.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

San Diego Gas & Electric Company, Complainant, v. Sellers of Energy and Ancillary Services into Markets Operated by the California Independent System Operator Corporation and the California Power Exchange, Respondents.	)	Docket Nos. EL00-95-000 EL00-95-045 EL00-95-075
Investigation of Practices of the California Independent System Operator and the California Power Exchange	)	EL00-98-000 EL00-98-042 EL00-98-063

PREPARED REBUTTAL TESTIMONY OF
PHILIP HANSER
ON BEHALF OF THE CALIFORNIA PARTIES

I. INTRODUCTION

Q. Please state your name and background.

A. My name is Philip Hanser. I am the same Philip Hanser that previously testified in these proceedings[1]. My qualifications are contained in my prior testimony.

Q. What is the purpose of your rebuttal testimony?

A. I respond to the arguments provided in the testimony of Mr. Cliff Hamal[2] and Drs. Scott Harvey and William Hogan[3] related to hockey stick bidding, and to the econometric analysis of outage rates provided in the testimony of Drs. Harvey and Hogan. Section II presents my rebuttal related to hockey stick bidding, and Section III includes my response to the econometric analysis of outage rates in the testimony of Drs. Harvey and Hogan.

II. HOCKEY STICK BIDDING

Q. Does it appear to be the case that Suppliers engaged in hockey stick bidding?

A. Yes, they used this approach extensively. As my prior testimony demonstrated, suppliers increased their bid margins the larger their market position and in response to tighter market conditions. The degree to which this

[1] Exh. Nos. CA-9 and CA-10.
[2] Prepared Direct Testimony of Cliff H. Hamal (Exh. No. REL-1).
[3] Prepared Direct Testimony of Scott M. Harvey and William H. Hogan (Exh. No. MIR-1).

occurred varied across suppliers, nonetheless this approach to setting bid margins was used by all suppliers for nearly all time periods.

Q. Could you provide an example of this sort of bidding by Suppliers?

A. Yes, Reliant, like all of the other Suppliers, engaged in such a bidding approach as can be seen in Exh. No. CA-371, where their traders structured bids with increasing markups over their generation costs, the basic hockey stick structure. From this document it is clear that Reliant employed this strategy extensively during declared ISO emergencies in December 2000. One of the more colorful examples, also provided by Reliant, appears in a transcript of a conversation on June 13th between Kevin Frankeny, one of Reliant's chief traders, and another Reliant employee, which finds Frankeny instructing the development of energy bids associated with ancillary services running from a generation cost of $42/MWh up to $750/MWh:

> *"Kevin: And when you do the energy curves we want to push the price up to 750 because they are probably going to need it. So I mean you start, you know, down around 42.*
>
> *Bill: Work all the way up?*
>
> *Kevin: Work it up, all the way up.*
>
> *Bill: Okay.*
>
> *Kevin: Yep. All the way to the top." Exh. No. CA-370.*

The direct testimony of Dr. Carolyn Berry discusses many other instances of this sort of bidding practice by many suppliers. (*See* Exh. No. CA-7.)

Q. Did Mr. Hamal argue that hockey stick bidding is a legitimate bidding strategy?

A. Yes. As mentioned on page 3 and pages 32-33 in his testimony, Mr. Hamal suggested that hockey stick bidding does not constitute market manipulation, and is in fact necessary partly because this bidding strategy enables a generation owner to recover investment costs. Moreover, he argued that hockey stick bidding could also provide pricing signals for new generation.

Q. Do you agree with Mr. Hamal on the necessity of hockey stick bidding to recover investment costs and to provide pricing signals for new generation investment?

A. No. First, hockey stick bidding in energy markets is not necessary to recover investment costs. The combination of revenues from the energy and ancillary services markets should provide sufficient revenues to recover costs and earn competitive returns in the long run, even if the suppliers do not employ hockey stick bids. In particular, the CAISO real-time energy markets are based on a uniform-price auction, in which all accepted bids receive a single market-

clearing price for their output[4]. This means that the sellers receive the same price for all inframarginal capacity and inframarginal units. Hence, most of the units are paid a price that exceeds their bids. Moreover, even the marginal unit bidding its marginal cost of generation only in the energy market would get a contribution to recover its investment costs as long as its marginal cost exceeds its average cost of generation. Therefore, most suppliers who are inframarginal can expect to recover their investment costs in the long run by bidding their marginal costs for their units in the energy markets, without resorting to hockey stick bidding or any other bidding strategy that deviates from marginal cost.

Moreover, and importantly, the energy markets are not the only source of revenue for suppliers. Ancillary service markets, such as operating reserves markets, provide reservation payment compensation in addition to the revenues from energy markets for generation output actually produced. A supplier bidding into the operating reserves markets, whose bid is accepted, receives a contribution toward investment costs even if the unit is never dispatched (i.e., does not receive any energy market payments) or the unit is only dispatched at prices equal to its average generation cost. These payments from the ancillary services markets combined with revenues from the energy markets should also

[4] From December 8, 2000 until June 20, 2001 the CAISO instituted a so-called "soft" price cap. During this period bidders could bid above the $250 price cap, but bids above the cap did not set the market price. Thus, the supplementary energy market behaved as a uniform price auction up to the price cap and as a discriminatory auction above the price cap. Obviously our analysis on inframarginality of bids during this period holds only for bids below the price cap.

provide signals for new entry when the generation is scarce. This is particularly the case when scarcity makes reserve capacity very valuable.

Third, FERC found in its April 26, 2001 Order[5] that hockey stick bids, in fact, are anti-competitive and prohibited.

Fourth, and finally, the various other witnesses who have submitted testimony as part of the California Parties March 3, 2003 filing, including Dr. Peter Fox-Penner (Exh. No. CA-1), Dr. Gary Stern (Exh. No. CA-3), Dr. Robert J. Reynolds (Exh. No. CA-5), and the aforementioned Berry, have documented strategies used by the various sellers in the market to withdraw supply from the PX or ISO auction markets. My March 3 testimony, which described outage situations reported to the ISO that are inconsistent with the facts likewise show a strategy of withdrawing supply from the PX or ISO auctions. The hockey stick bids submitted by sellers were a way to capitalize on that withdrawal of supply, to ensure that the withdrawal of supply would lead to higher prices. Thus, the hockey stick bids should not be viewed in isolation, but should instead be considered in light of the various strategies that have been documented. Viewed in that light, there is no question that hockey stick bids were an anti-competitive effort to exercise market power.

Q. Did Mr. Hamal also argue that bidding above marginal cost is desirable for scarcity pricing?

[5] *San Diego Gas & Electric Co. et al.*, 95 FERC ¶61,115 at 61,360 (2001).

A. Yes. He suggests that bidding some of the capacity above marginal cost results in rising prices when the system gets closer to scarcity conditions. Conversely, he argues that bidding all capacity at marginal costs results in higher prices only during scarcity conditions, when the demand is involuntarily curtailed.

Q. Do you agree with Mr. Hamal that bidding generation at marginal cost would increase market prices only during shortage conditions, so that the price signals for new entry starts forming too late?

A. No. As the system moves towards exhausting supply, a competitive market -- with suppliers bidding all capacity at marginal cost -- produces two important price signals for new generation. The first price signal is an increase in energy prices due to the fact that less efficient generating resources are coming on-line to meet demand. The second price signal begins when the CAISO awards ancillary service payments for resources providing reserve capacity. The price for reserve capacity will increase sharply during scarcity conditions. And if the units that the CAISO holds in reserve are called to produce energy, these reserve resources are paid for both their energy and for reserving their capacity. Therefore, even before the system reaches actual demand curtailment, the energy and ancillary services markets provide strong price signals indicating that the resources are getting closer to shortage conditions.

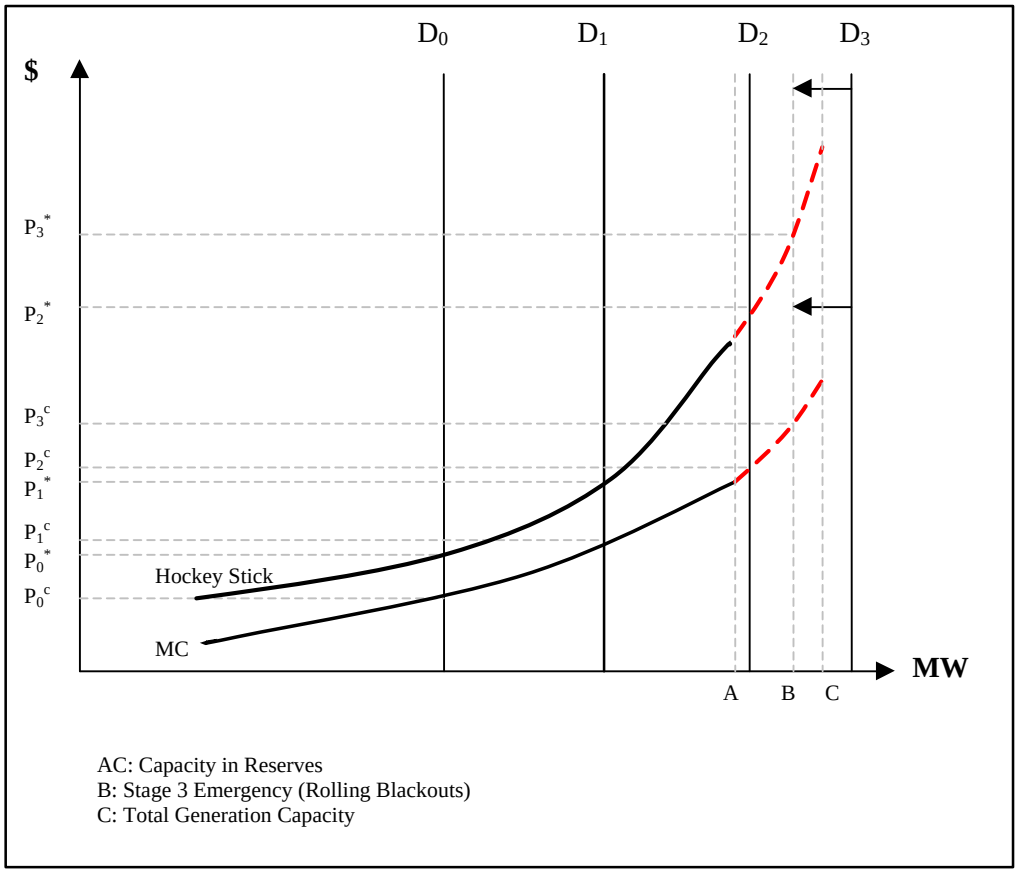
The price signals provided by markets as the system moves closer to shortage conditions are illustrated in Figure 1.[6] I compared the implications of two forms of bidding behavior. The first one (labeled as "MC") is the bid curve that corresponds to bidding at marginal cost. The second one (labeled as "Hockey Stick"), is the bid curve for hockey stick bidding above marginal costs. The solid portion of each bid curve represents the bids in the energy market, and the dashed portion at the end represents the capacity associated with the energy bids in reserve markets. The inelastic market demand takes several values, labeled as D_0 through D_3.

The first observation from the figure is that the hockey stick bidding yields higher market prices relative to bidding at marginal cost, especially when the demand is high. Moreover, as demand rises from D_0 to D_1, the competitive market price increases (from p_0^c to p_1^c) due to less efficient units being called to generate. But the same increase in demand would lead to a higher change in prices when suppliers submit hockey stick bids. If the demand increases to D_2, then energy bids associated with reserves will be "bids in the energy market". The competitive price would rise to p_2^c, and a portion of demand is satisfied by the generating units held by the CAISO as reserves. But if the demand gets higher than the level after which a Stage 3 emergency is declared (rolling blackouts), the CAISO curtails demand randomly among different consumers to point B. Note that this curtailment would not be needed if the demand was

[6] *See* Exh. No. CA-1 at 57-65.

responsive to price. Hockey stick bidding during those curtailment conditions would only increase the price, without any efficient rationing from the demand side. Note that this figure does not show payments for reserve capacity.

Figure 1



Q. Do you agree that it is necessary for suppliers to use hockey stick bidding in the California electricity market in order to have an efficient allocation of scarcity rents between suppliers and consumers?

A. No. First, the concept of efficient allocation of scarcity rents through bids in competitive markets is based on the premise that market demand is responsive to price, i.e. there are some customers who are willing to pay for the last unit of energy more than some others when all of the supply resources are exhausted. If electricity demand was responsive to price, then the resulting price during market scarcity conditions would be capped by the marginal willingness to pay of the consumer who assigns the most value to that last unit of energy[7]. However, the demand for electricity in real-time is practically vertical, i.e. consumers do not respond to real-time market prices because they never see those prices. The electricity market cannot allocate supply or scarcity rents efficiently when demand is not sensitive to price. Thus the rents that accrue to the marginal generator, resulting from bids substantially above marginal costs, are proceeds that flow from that supplier's market power and little of that is what economists would label as scarcity rents. In extreme shortage conditions, the system operator will curtail some demand randomly so that the balance between supply and demand is restored. Although this rationing of limited generation sources among consumers is inherently inefficient (because of consumers' inability to respond to prices), this in no way implies that the suppliers need to bid substantially higher than their marginal costs to mimic the capture of scarcity rents that would arise in competitive markets with

[7] California's demand responsiveness programs were legally prohibited from interrupting customer loads solely in response to excessively high prices through 2001. Interruptions could only occur when system reliability was threatened as denoted by the various Stage Emergencies. Even so, such programs had a relatively small subscription base (i.e., less than 2,000 MW), and many customers failed to respond to interruption calls because the penalties were set too low.

responsive demand. Although the generators' ability to capture rents may be due to scarcity, the majority of the rents collected are due to their market power.

Second, and more importantly, hockey stick bidding occurred during many hours when no scarcity actually existed. It is simply disingenuous to justify around-the-clock hockey-stick bidding based on a situation that occurred in a very limited number of hours during the period. Hockey stick bidding absolutely is not necessary to recover investment costs during these periods, and cannot be justified in any way as an "allocation mechanism" during the hours when true scarcity did not occur, which is the vast majority of the period. As I discussed above, units are able to recover their investment costs during hours when their own costs are inframarginal to the market price. In addition, as I discussed above, ancillary services sales are another means of recovering investment costs since a generator need not incur any cash costs while selling these services.

Q. Did Drs. Harvey and Hogan also present similar arguments attempting to justify hockey stick bidding in shortage conditions?

A. Yes. As explained in their testimony,[8] they suggest that competitive suppliers have an incentive to submit bids exceeding marginal costs in shortage conditions. Drs. Harvey and Hogan also argue that the CAISO is required by

[8] Exh. No. MIR-1 at 143.

"NERC and WSCC policy" to accept all bids not exceeding the price cap during shortage conditions.[9]

Q. Do you agree with Drs. Harvey and Hogan on these issues?

A. I agree with them that suppliers in California have an incentive to bid above marginal costs, especially during shortage conditions. However, I do not agree that this is the behavior that one should expect from suppliers under competitive conditions.

As I mentioned earlier, the effects of such hockey stick bidding behavior would be mitigated by the demand side if consumers had the ability to respond to prices. But in the absence of such price discipline from consumers, suppliers' bidding their last increments of capacity at the price cap corresponds to exercising market power to extract excess rents.

Moreover, I disagree with their interpretation that minimum operating reserve requirements set by NERC and WSCC motivated suppliers to bid their generation at the price cap. From my earlier testimony it is clear that Duke does not seem to have been compelled to raise its bids excessively in periods when the market was tight as did other generators. (*See* Exh. No. CA-9.) The minimum reserve requirements effectively increase the need for capacity so that the required minimum reserves are kept for system contingencies.

[9] Exh. No. MIR-1 at 145.

However, this does not validate the behavior of suppliers to bid much higher than their marginal costs during the shortage conditions.

III. STATISTICAL ANALYSIS OF OUTAGE RATES

Q. Do you have any concerns about the statistical analysis performed by Drs. Harvey and Hogan on Mirant's generating units' outage rates?

A. Yes, there are three issues that make their analyses suspect. First, their model fails to account for economic incentives for Mirant to shut its units down. Second, their analysis merges the data of two fairly different generation technologies, potentially leading to misspecification of their models. Third, their exclusion of reserve shutdowns also leads to a biasing of their results.

Q. How do Drs. Harvey and Hogan fail to account for the economic incentives properly?

A. Drs. Harvey and Hogan indicate that their analysis suggests that as market-clearing prices rose in California, outage rates appeared to fall and they treat this as confirming their hypothesis that Mirant did not withhold its generating units. There are two problems with this conclusion. First, if Mirant were to pursue a withholding strategy, as conditions in the market tighten, the amount that it needs withhold in order to affect price goes down. Thus, if fewer of Mirant's units are out when market conditions are tight and prices are high, then contrary to Drs. Harvey and Hogan, this situation is completely consistent

with a withholding strategy. A more rigorous, but not conclusive, test of whether outage rates were consistent with competitive behavior would be to test the price-outage relationship among different years when competitive behavior was more likely, e.g. 2000 versus 1999 and 1998, and even before divestiture. H&H have not done this necessary step, so no conclusions can be drawn from their analysis. Second, in the case of the California market, a more important determinant of the incentive to withhold capacity through outages were the caps on sellers bids. What was evidenced in the pattern of outages by Mirant, among other sellers, is that as the price caps fell, the outage rates went up. Again, this is consistent with a withholding strategy to raise prices. As the price caps were reduced, the capability to effect an economic withholding strategy was also reduced and, thus, physical withholding became more attractive as a means of raising prices. Drs. Harvey and Hogan include no variables in their model to account for the incentives to physically withhold that would result from the changes in the price cap regimes.

Q. Please explain how Drs. Harvey and Hogan merge the data of two fairly different generation technologies and how this is a misspecification of their models?

A. The statistical outage analysis that they performed merged the data from two substantially different generation technologies, steam turbines and combustion turbine. While both technologies have turbine in their names, how they are operated and their thermal-mechanical characteristics are substantially

different. Combustion turbines have relatively low capacity factors and can be at nearly full load within 10-30 minutes. Past utility generation operating practice would label them as peaking units. Steam turbines have much longer start-up times, measured in hours, not minutes, and have been used in the past as intermediate load units. Other differences include the frequency and nature of their overhauls. Combustion turbines have fairly strict limitations on the number of "equivalent operating hours" between overhauls typically indicated by the turbine manufacturer, while steam turbine overhauls tend to be a function of their boiler's condition. Most importantly, older CTs of the vintage owned by Mirant and other merchant generators have substantially higher outage rates than steam turbines. When merging these outage rates, the average can be greatly influenced by many other factors, such as overall availability, output, and other types of maintenance. In any event, the net result of these differences is that it seems unlikely that their merging the data together can be taken as reasonable. Although their analysis makes a relatively weak attempt at dealing with this by including at most a pair of variables representing each plant, such an approach is inadequate at best, certainly leading to a misinterpretation of the statistical results and, at worst, casts doubt on their entire analysis.

Q. What do you mean that failing to include the reserve shutdowns biases their results?

A. Drs. Harvey and Hogan exclude reserve shutdowns from their analysis, arguing that a reserve shutdown arises because of a lack of demand. There are two problems with this approach. First, although Drs. Harvey and Hogan argue that the Potrero jets (Potrero units 4, 5, and 6) were under the control of the CAISO, this claim is not supported by the documents cited in their testimony. The Potrero jets were Condition 1 RMR[10] units for the years 2000 and 2001, and their RMR status changed to Condition 2 on January 1, 2002.[11] But even the RMR contracts do not transfer the control of the RMR units to the CAISO. The CAISO can give dispatch orders to the RMR units only when the units are needed for local reliability reasons or for managing intra-zonal congestion.[12] Therefore, Reliant had control over whether to bid its Potrero jets into markets during 2000 and 2001.[13] However, as explained in my testimony, Potrero 6 was placed on reserve shutdown by Mirant during a Stage 2 emergency on November 20, 2000.[14] Thus, of their study period, only a relatively small proportion constitutes the period of CAISO control and, further, it appears that there may be motives other than lack of demand inducing reserve shutdowns. Note that Drs. Harvey and Hogan fail to have any variables in their models that

[10] According to the CAISO's Pro Forma Must Run Service Agreement, a Condition 1 RMR unit may participate in market transactions, and the unit's owner retain all revenues from participation in market transactions. A Condition 2 RMR unit cannot participate in market transactions unless the CAISO issues a dispatch notice for the unit. Moreover, a Condition 2 RMR unit cannot retain the revenues from market participation when it is called. (*See* CAISO, "*Pro Forma* RMR Agreement", p. 20 (http://www.caiso.com/docs/2001/10/15/2001101510162513782.doc))

[11] *See* CAISO, "2002 Annual RMR Informational Report" for the change of RMR status of Potrero jets from Condition 1 to Condition 2 on January 1, 2002. (http://www.caiso.com/docs/2003/02/12/200302121433346567.xls)

[12] CAISO, "Pro Forma RMR Agreement", p. 22. *See also* CAISO, "Commentary by the California Independent System Operator Corporation on the CPU.2 Staff Investigative Report on Wholesale Electric Generation, released September 17,2002", p. 9, (http://www.caiso.com/docs/2002/10/28/200210281512206799.pdf).

[13] On April 26, 2001, the FERC ordered the sellers to offer all of their available capacity in real time markets or through bilateral agreements (must-offer requirement). (*See* San Diego Gas & Electric et al., 95 FERC ¶61,115 (April 26, 2001)).

attempt to distinguish the period of CAISO control from the period in which Mirant had sole control. Second, their exclusion of reserve shutdowns and treating them as "time out"[15] is problematic because Sellers who placed their units on reserve shutdown would often perform repairs on the units during reserve shutdowns, although they often would not declare to the ISO what their activities were. As a result, the frequency and duration of outages is also contingent not only on overhauls and forced outage outages, a variable included in their analysis, but also reserve shutdowns, a variable not included in their model. Thus, their model suffers from an omitted variable bias. The degree to which their estimated coefficients differ from estimates where this problem has been resolved depends on how correlated the omitted variable is with the other variables in their estimated equation.

Q. Does this conclude your testimony?

A. Yes, it does.

[14] Exh. No. CA-10 at 37.
[15] Exh. No. MIR-1 at 238.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

San Diego Gas & Electric Company, Complainant	)	
v.	)	Docket Nos. EL00-95-069
Sellers of Energy and Ancillary Services Into Markets Operated by the California Independent System Operator Corporation and the California Power Exchange, Respondents.	)	
Investigation of Practices of the California Independent System Operator and the California Power Exchange.	)	Docket Nos. EL00-98-058

AFFIDAVIT OF PHILIP HANSER

I declare under penalty of perjury that the foregoing is true and correct.

Executed on March 20, 2003.

Philip Hanser