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UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

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

PREPARED TESTIMONY OF
DR. CAROLYN A. BERRY
ON BEHALF OF THE CALIFORNIA PARTIES

Index of Relevant Material Template

Submitter (Party Name)	California Parties
Index Exh. No.	CA-7
Privileged Info (Yes/No)	Yes
Document Title	Prepared Testimony of Dr. Carolyn A. Berry on Behalf of the California Parties
Document Author	Dr. Carolyn A. Berry
Doc. Date (mm/dd/yyyy)	03/03/2003
Specific finding made or proposed	Prices in the ISO and PX Spot Markets from October 2, 2000 to June 20, 2001 were unjust and unreasonable. Prices before October 2, 2000 were not consistent with Sellers' market-based rate tariffs and those of the ISO and PX. Sellers withheld from the market. Numerous generators withheld by not bidding their output into the market even though their plants were fully operational. This withholding behavior occurred during numerous system emergencies. Numerous generators withheld generation from the market by bidding high, and in excess of their costs, so as to deliberately price themselves out of the market. Sellers submitted bids in the ISO Markets in order to exercise market power. Sellers participated in collusive acts. Sellers withholding and other market manipulation, not buyer underscheduling, led to forced reliance on the Real-Time Market. Sellers shared non-public generation outage information. Energy exchange transactions should be subject to refund.
Time period at issue	a) before 10/2000; 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	High prices in the ISO Real-Time Market for much of the May 2000 – June 2001 period were caused by the persistent attempts of certain in-state sellers and importers to manipulate the market by withholding supply and submitting bids at near ISO price cap levels. Reliant's manipulative behavior on June 21-22, 2000 was not an isolated event. There are additional instances, involving Reliant and others, of similar behavior. Sellers engaged in systematic bidding and "no bid" (withholding) behavior that is inconsistent with competition and contributed to the high and volatile prices in the Real-Time Market during the period May 1, 2000 through August 6, 2000. Anti-competitive bidding practices consisted of: hockey stick bids; persistent bids at or near the price cap; bid spikes; periods of no bidding when a unit's capacity was operable, uncommitted and apparently economic, particularly just prior to submitting bid price spikes; and bids from units with similar costs at very different prices. All of these types of bids were in general unrelated to the underlying costs of production. ISO emergencies, particularly those declared between May 2000 to August 5, 2000, were exacerbated by the supply and bidding behavior of certain in-state generators and importers. These emergencies were arguably caused by this perverse supply and bidding behavior. Finally, perverse bidding behavior was coordinated among sellers. On numerous occasions in-state generators and importers raised their bid prices on the same days, during emergency and non-emergency days alike. This coordination constituted either tacit or explicit collusion. Exchanges between BPA, Powerex and other sellers, on one hand, and the ISO and CERS, on the other hand, during the period November 2000 through June 2001, were done at ratios that resulted in substantial overcharging for energy sold into California.
Party/Parties performing any alleged manipulation	Reliant; Mirant; Dynegy; Williams; Duke; Enron; Powerex; LADWP; Idaho Power; BPA.

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

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1 **I. INTRODUCTION**

2 Q. Please state your name, occupation, and address.

3 A. My name is Dr. Carolyn A. Berry. I am an independent economic consultant.
4 My address is 7041 Western Ave. NW, Washington, DC 20015.

5 Q. Please state your qualifications.

6 A. I hold a Ph.D. degree in economics from Northwestern University and have over
7 8 years of professional experience analyzing electric markets. I was an
8 economist on the Staff of the Federal Energy Regulatory Commission (FERC)
9 from 1994-2000. As an economist at FERC, I had significant involvement in the
10 activities related to the development and monitoring of the market for wholesale
11 electricity in California. Since leaving FERC, I have been an economic
12 consultant working in a number of areas in the electric industry, both nationally
13 and internationally. I have continued to be involved in developments taking
14 place in the California electricity markets. A detailed statement of my
15 professional experience and educational background is found in Appendix A.

16 Q. Have you previously submitted testimony at the Federal Energy Regulatory
17 Commission?

18 A. Yes. I have submitted testimony previously in this proceeding on behalf of
19 Pacific Gas and Electric Company (PG&E) and the California Parties. As a staff
20 economist at FERC, I prepared testimony in the California Reliability Must-Run
21 (RMR) proceeding.

22 Q. On whose behalf are you submitting this testimony?

1 A. I am testifying on behalf of PG&E and the following California Parties: the
2 People of the State of California, *ex rel.* Bill Lockyer, Attorney General, the
3 California Electricity Oversight Board, the Public Utilities Commission of the
4 State of California, and Southern California Edison Company.

5 **II. SUMMARY/CONCLUSIONS**

6 Q. What is the purpose of your testimony?

7 A. I have been asked by PG&E and the California Parties to describe the bidding
8 behavior of certain in-state generators and importers in the California
9 Independent System Operator (ISO) real time market for the relevant period
10 (January 1, 2000 through June 20, 2001). I have also examined other data, such
11 as schedules, meter data, and California Power Exchange (PX) data in order to
12 provide a better understanding of the real time bid data. My analysis focuses on
13 the five large in-state generation owners; Reliant Energy Power Generation, Inc.
14 and Reliant Energy Services, Inc. (collectively "Reliant"); Mirant Americas
15 Energy Marketing, LP ("MAEM"), Mirant California, LLC ("Mirant
16 California"), Mirant Delta, LLC ("Mirant Delta"), and Mirant Potrero, LLC
17 ("Mirant Potrero") (collectively, "Mirant"); Dynegy Power Marketing, Inc.,
18 Dynegy Power Corp., El Segundo Power LLC, Long Beach Generation LLC,
19 Cabrillo Power I LLC and Cabrillo Power II LLC (collectively, "Dynegy");
20 Williams Energy Marketing & Trading Company and Williams Energy Services
21 Company (collectively, "Williams"), and Duke Energy North America, LLC
22 ("DENA"), and Duke Energy Trading and Marketing, L.L.C. ("DETM")
23 (collectively "Duke"); and five selected importers, Enron Power Marketing, Inc.
24 (Enron), Powerex Corporation (Powerex), Los Angeles Department of Water

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1 and Power (LADWP), Idaho Power Company (Idaho Power), and Bonneville
2 Power Administration (BPA).

3 Additionally, I have been asked to briefly explain the nature and costs of energy
4 exchange transactions during the relevant period.

5 A. Upon examination of the real time bid data and other supporting data, I make the
6 following conclusions:

7 1. It was not principally the natural forces of supply and demand that drove
8 up prices in the ISO real time market for much of the May 2000 to June 2001
9 period. Rather, high prices were caused by the persistent attempts of certain
10 in-state sellers and importers to manipulate the market by withholding supply
11 and submitting bids at near ISO price cap levels.

12 2. Reliant's manipulative behavior on June 21-22, 2000 was not an isolated
13 event. There are additional instances, involving Reliant and others, of similar
14 behavior. Moreover, on June 21-22, 2000, other sellers in addition to Reliant
15 withheld supply from the day-ahead market and bid price spikes into the ISO's
16 real time market.

17 3. Not all sellers engaged in manipulative bidding behavior all the time.
18 Duke, for example, appears to have bid into the ISO's real time market at close
19 to marginal cost during the summer of 2000.

20 4. Sellers engaged in systematic bidding and "no bid" (withholding)
21 behavior that is inconsistent with competition and contributed to the high and
22 volatile prices in the real time market during the period of May 1, 2000
23 through August 6, 2000. From August 7, 2000 through December 7, 2000,
24 under the $250 price cap, sellers reduced their participation in the real time
25 market. Finally, from December 8 to June 2001, numerous sellers stopped

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selling energy in the real time market entirely, or increased their bid prices up to 10 times previous levels.

5. Anti-competitive bidding practices consisted of

- hockey stick bids (bid curves with price segments that varied dramatically),
- persistent bids at or near the price cap,
- bid spikes, or dramatic variation in bid prices from a single unit on a day-to-day basis,
- periods of no bidding when a unit's capacity was operable, uncommitted and apparently economic, particularly just prior to submitting bid price spikes, and
- bids from units with similar costs at very different prices.

These types of bids were in general unrelated to the underlying costs of production. In all likelihood, they were strategically used by sellers to increase real time prices during the relevant period.

6. ISO emergencies, particularly those declared between May 2000 to August 5, 2000, were exacerbated by the supply and bidding behavior of certain in-state generators and importers. These emergencies were arguably caused by this perverse supply and bidding behavior. There is no doubt that sellers opportunistically took advantage of them to increase prices.

7. Perverse bidding behavior was coordinated. On numerous occasions in-state generators and importers raised their bid prices on the same days, during emergency and non-emergency days alike. The first prominent episode of

1 coordinated behavior occurred during the first week of May 2000. It appears
2 that Williams withheld a large amount of capacity from the day-ahead markets
3 on May 1-2. From May 2-6 numerous sellers spiked the bid prices that they
4 offered into the real time market. This coordination, and other coordinated
5 events, could have been facilitated by publicly available information such as
6 public reports on system conditions. If so, it is a form of tacit collusion. On
7 the other hand, this coordination could have been facilitated by privately held
8 information such as outage reports obtained through Industrial Information
9 Resources, Inc. (IIR) or by direct communications between the parties. In this
10 case, the coordination would be a form of explicit collusion.

11 Q. Please summarize your conclusions about energy exchange transactions.

12 A. BPA, Powerex, and several others used energy exchange transactions to sell
13 energy to California from November 2000 through June 2001. In numerous
14 instances, these exchanges were done at ratios that resulted in substantial
15 overcharging for energy sold into California.

16 Q. How does your testimony relate to the testimonies filed by the other California
17 Parties' witnesses?

18 A. The California Parties were granted 100 days to adduce additional evidence of
19 market manipulation in the California energy markets. The California Parties
20 have found evidence of market manipulation. The story however is not simple.
21 It has been pieced together through an extensive analysis of gigabits of data and
22 the review of thousands of documents obtained through discovery. The
23 testimonies of Dr. Fox-Penner, Dr. Stern, Dr. Reynolds, Dr. Hanser, Dr.
24 McCann, Dr. Harris, Mr. Green, Mr. Tarplee, and myself, must be viewed as a
25 whole. Collectively, they tell a compelling story of market abuse.

1 My testimony, as I have highlighted above, describes anti-competitive bidding
2 behavior in the ISO real time market. Dr. Stern (Exh. No. CA-3) shows in his
3 testimony, that throughout the summer of 2000 and on through the rest of 2000
4 and into 2001, sellers deliberately withheld supply from the PX day-ahead
5 market with the intention of forcing buyers into the real time market to satisfy
6 their load requirements. This is significant. If markets were workably
7 competitive, increased demand in the real time market would cause a decrease in
8 real time prices. But, as I show in my testimony, the bidding behavior in the real
9 time market *kept prices high*. Thus increased demand in the real time market not
10 only jeopardized the reliable operation of the California electric system, but it
11 allowed sellers to handsomely profit through increased sales at high prices.

12 Dr. Fox-Penner (Exh. No. CA-1) has done an exhaustive study of Enron
13 manipulation schemes that were commonly used by dozens of sellers in the
14 California markets. One of those schemes, Fat Boy, involved scheduling non-
15 existent load with the ISO. The scheme allowed sellers to avoid placing their
16 supplies in the centralized PX day-ahead market -- the market from which
17 utilities (and the lion's share of load in California) were required to purchase
18 their energy needs. This had the effect of increasing prices in the day-ahead
19 market and forcing load into real time. As I show in my testimony, anti-
20 competitive bidding in the real time market kept real time prices high. The Fat
21 Boy strategy had a direct effect on the real time market as well. Fat Boy supply
22 was dumped into real time as uninstructed deviations (and was paid the real time
23 price). It did not get bid into ISO real time market. Therefore, the number of
24 bids in the real time market was necessarily reduced. This is significant. I show
25 in my testimony that on numerous occasions 4 or 5 large suppliers all bid price
26 spikes simultaneously. It is easier for a small number of bidders to have a

1 significant impact on the real time price when the pool of bids is significantly
2 reduced through a Fat Boy strategy. Dr. Fox-Penner also investigates ricochet
3 transactions, parking arrangements, and MW laundering. Any Enron scheme
4 that removes power from California on a day-ahead basis and returns it to
5 California in real time is necessarily and intrinsically linked to anti-competitive
6 bidding behavior in the real time market. The Enron strategies dramatically
7 increased both the incentives and the ability for sellers to manipulate real time
8 prices. That is, most or all of the strategies increased the perception of scarcity,
9 making it more likely that sellers in the real time market would bid high – and by
10 spiking the real time bids, the sellers made the manipulative strategies highly
11 profitable. The ISO and others have attempted to quantify the impact of the
12 Enron strategies at times, but most such quantifications have ignored the
13 simultaneous spiking of bids for the remaining supply, and thus most estimates
14 dramatically understate the cost of the strategies.

15 Drs. Reynolds (Exh. No CA-5) and Hanser (Exh. No. CA-9) examine the anti-
16 competitive behavior of in-state generators. In-state generators could directly
17 affect market prices by withholding their generation resources from the market
18 and the evidence shows that they did. One form of withholding is bidding high
19 bid prices, another is not bidding at all. My testimony shows that both of these
20 bidding strategies were pervasive. In addition, the results in my testimony show
21 that anti-competitive bidding behavior was coordinated. How these coordinated
22 bidding patterns were formed is not yet fully understood, but there is evidence
23 that sellers shared sensitive market information with each other. This is
24 explained in Dr. Fox-Penner's testimony.

25 The testimonies of Dr. McCann, Dr. Harris, Mr. Green, and Mr. Tarplee address
26 the issues of emissions, natural gas, state energy purchases, and reliability rules

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1 respectively. These testimonies provide further rationale for market
2 manipulation and evidence of explicit tariff violations.

3 III. DESCRIPTION OF ANALYSIS AND SUMMARY OF RESULTS

4 Q. Please describe your analysis and the data that you used.

5 A. My analysis is limited to the five large owners of in-state generators; Reliant,
6 Mirant, Dynegy, Williams, and Duke, and five importers; Enron, Powerex,
7 LADWP, Idaho Power, and BPA. I used data that was newly obtained from the
8 ISO during the 100-day discovery period granted by the Commission in its
9 November 20, 2002 discovery order. *San Diego Gas & Electric Co., et al.*, 101
10 FERC ¶ 61,186 (2002). As a first step, I examined the ISO real time bid data,
11 also known as the BEEP stack data, by calculating for each unit on a monthly
12 basis, average bid prices, average bid spans, and the percentage of hours a unit
13 was bid into the real time market.[1] The numerical results provide a general sense
14 of the level of bids, the variability of prices within a bid, and the frequency that a
15 unit was bid into the market.

16 Q. How did you calculate the average bid price?

17 A. The average bid price for a unit was calculated by taking a weighted average
18 (weighted by the MWs) of each price segment within a bid to get an hourly
19 average bid price. All hourly bid prices were then averaged over the month to
20 get a monthly average.

---

[1] The ISO real time market, also known at the real time imbalance energy market, accepts bids on an hourly basis. Bids that are submitted before the start of the hour are called supplemental energy bids, and can be offers to both supply energy (incremental bids) and/or to buy energy (decremental bids). In addition, all sellers that supply spin, non-spin, and replacement reserves, must submit a bid to supply energy into the real time market from this reserve capacity. The ISO stacks all bids in merit order in what is known as the BEEP stack, and dispatches incremental and decremental energy economically from this stack in real time.

1 Q. What is an average bid span?

2 A. The bid span is defined as the difference between the lowest and highest price
3 segment within a bid. Since there is one bid in each hour, there will be one bid
4 span for each unit in each hour. The average bid span is simply the average of
5 these bid spans over the month. The average bid span provides an indication of
6 the degree to which bids have a "hockey-stick" like shape. Such a bidding
7 pattern would involve some portion of the bid quantity being offered at
8 substantially higher prices than other portions.

9 Q. What were the results of this general analysis?

10 A. Average bid prices and bid spans were high in the summer of 2000. As one
11 would expect, average prices and bid spans fell as the price cap was lowered
12 from $750 to $500 on July 1, 2000, and then from $500 to $250 on August 7,
13 2000.[2] After the $250/month soft cap was implemented on December 8, 2000,
14 average prices and bid spans increased dramatically.[3] Figure 1 and Figure 2
15 show the in-state units and the importers that had the highest average monthly
16 bid prices, respectively. Figure 3 and Figure 4 show the highest average bid
17 spans for in-state generators and importers, respectively. Note that the very high
18 average bid prices for in-state generators occur after the implementation of the

[2] Throughout this testimony, average monthly bid prices and average monthly bid spans are calculated from July 1 – August 6 for the month of July, August 7 – August 31 for the month of August, November 1 – December 7 for the month of November, and December 8 – December 31 for the month of December. This is done to reflect the change in price caps in the summer of 2000 and the implementation of the soft cap in December.

[3] There was a hard price cap in effect in the real time market of $750 from January 1, 2000 through June 30, 2000. The hard price cap was lowered to $500 on July 1, 2000 and lowered again to $250 on August 7, 2000. From August 8, 2000 to December 7, 2000 the hard price cap remained at $250. On December 8, 2000 the ISO implemented a soft cap of $250. Under the soft cap, the market price paid by buyers was capped at $250. However sellers could submit bids into the real time market above $250. If the ISO accepted any bid above $250, the seller was paid its bid price for the energy it sold to the ISO. Starting January 1, 2001, the soft cap was lowered to $150 and remained at $150 until May 28, 2001. From May 29, 2001 to June 20, 2001 new mitigation was in effect that capped the real time price during emergency hours.

1 $250/month soft cap in December 2000. On the other hand, for importers, the
2 very high bid prices occur throughout 2000: prior to the summer of 2000, during
3 the summer of 2000 and in December that year. Importers generally did not
4 participate in the real time market after January 2001, but instead made sales to
5 the California Energy Resources Scheduling Division of the California
6 Department of Water Resources (CERS) or to the ISO through other
7 mechanisms. Hockey stick bidding was most prevalent among both in-state
8 generators and importers from January 2000 – July 2000 and in December 2000.
9

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Figure 1
Top 40 Average Bid Prices*
In-State Units

MONTH	SC_ID	SC Name	UNIT_ID	AVG BID PRICE ($)
Feb-01	DETM	Duke	SOBAY_7_SY4	3880.00
Jan-01	DETM	Duke	SOBAY_7_SY4	3693.44
Dec-00	ECH1	Dynegy	CRNRDO_7_NIGT2	2063.50
Apr-01	NES1	Reliant	MNDALY_7_UNIT 3	1988.61
Dec-00	ECH1	Dynegy	DIVSON_7_DIGT1	1954.37
May-01	NES1	Reliant	MNDALY_7_UNIT 3	1905.11
Apr-01	NES1	Reliant	GOLETA_6_ELLWOD	1900.02
May-01	NES1	Reliant	GOLETA_6_ELLWOD	1850.77
Dec-00	WESC	Williams	HNTGBH_7_UNIT 5	1634.04
Dec-00	ECH1	Dynegy	MRGT_7_UNITS	1543.15
Feb-01	DETM	Duke	SOBAY_7_SY2	1540.00
Feb-01	DETM	Duke	SOBAY_7_SY1	1540.00
May-01	NES1	Reliant	ETIWND_7_UNIT 5	1500.00
Dec-00	ECH1	Dynegy	LBEACH_6_66TOT	1498.55
Dec-00	ECH1	Dynegy	CRNRDO_7_NIGT1	1497.87
Feb-01	DETM	Duke	SOBAY_7_GT1	1445.00
Dec-00	ECH1	Dynegy	ENCINA_7_GT1	1387.07
Dec-00	ECH1	Dynegy	ELCAJN_7_GT1	1360.37
Feb-01	DETM	Duke	MOSSLD_7_UNIT 7	1335.00
Jan-01	DETM	Duke	SOBAY_7_SY2	1289.16
Apr-01	NES1	Reliant	ETIWND_7_UNIT 5	1256.36
Dec-00	ECH1	Dynegy	OLDTWN_7_NTCGT1	1201.19
Feb-01	DETM	Duke	MORBAY_7_UNIT 1	1170.00
Dec-00	ECH1	Dynegy	ELSEGN_7_UNIT 2	1147.08
Dec-00	ECH1	Dynegy	KEARNY_7_KY1	1143.24
Feb-01	DETM	Duke	MORBAY_7_UNIT 2	1140.10
Dec-00	ECH1	Dynegy	ELSEGN_7_UNIT 1	1113.25
Dec-00	ECH1	Dynegy	KEARNY_7_KY2	1067.76
Feb-01	DETM	Duke	MORBAY_7_UNIT 4	1065.00
Feb-01	DETM	Duke	MORBAY_7_UNIT 3	1065.00
Dec-00	WESC	Williams	REDOND_7_UNIT 5	1062.72
Dec-00	ECH1	Dynegy	KEARNY_7_KY3	1037.15
Feb-01	NES1	Reliant	MNDALY_7_UNIT 3	995.86
Jan-01	DETM	Duke	SOBAY_7_SY1	914.42
Jan-01	DETM	Duke	MOSSLD_7_UNIT 7	902.48
Jan-01	NES1	Reliant	MNDALY_7_UNIT 3	851.34
Feb-01	WESC	Williams	ALAMIT_7_UNIT 7	831.45
Dec-00	NES1	Reliant	MNDALY_7_UNIT 3	783.51
Dec-00	WESC	Williams	ALAMIT_7_UNIT 2	778.40
Feb-01	WESC	Williams	HNTGBH_7_UNIT 5	760.88

*Units with three or less bids per month and negative bids excluded.

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Figure 2
Top 40 Average Bid Prices*
Importers

MONTH	TIEPOINT_SC_ID	SC_ID	SC Name	AVG BID PRICE ($)
Dec-00	SUMITM_1_SPP/IPC	IPC	Idaho Power	2000.00
Dec-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	980.21
Dec-00	MALIN_5_RNDMTN/PWRX	PWRX	Powerex	780.75
Feb-00	SLVRPK_7_SPP/IPC	IPC	Idaho Power	750.00
Jun-00	SYLMAR_2_NOB/IPC	IPC	Idaho Power	750.00
May-00	SLVRPK_7_SPP/IPC	IPC	Idaho Power	750.00
Apr-00	PVERDE_5_DEVERS/EPMI	EPMI	Enron	749.97
Apr-00	FCORNR_5_PSUEDO/EPMI	EPMI	Enron	749.95
Jan-00	MEAD_2_WALC/EPMI	EPMI	Enron	749.95
Jan-00	LUGO_5_VICTVL/EPMI	EPMI	Enron	749.94
Feb-00	MEAD_2_WALC/EPMI	EPMI	Enron	749.94
Mar-00	MEAD_2_WALC/EPMI	EPMI	Enron	749.92
Apr-00	LUGO_5_VICTVL/EPMI	EPMI	Enron	749.91
Jan-00	FCORNR_5_PSUEDO/EPMI	EPMI	Enron	749.90
Feb-00	LUGO_5_VICTVL/EPMI	EPMI	Enron	749.88
Mar-00	LUGO_5_VICTVL/EPMI	EPMI	Enron	749.88
Jun-00	FCORNR_5_PSUEDO/WESC	WESC	Williams	749.87
Apr-00	SYLMAR_2_LDWP/EPMI	EPMI	Enron	749.83
Mar-00	SYLMAR_2_LDWP/EPMI	EPMI	Enron	749.76
Mar-00	FCORNR_5_PSUEDO/EPMI	EPMI	Enron	749.59
May-00	SYLMAR_2_LDWP/EPMI	EPMI	Enron	749.55
Jun-00	LUGO_5_VICTVL/EPMI	EPMI	Enron	749.49
Jun-00	SYLMAR_2_LDWP/EPMI	EPMI	Enron	749.49
May-00	LUGO_5_VICTVL/EPMI	EPMI	Enron	749.49
Feb-00	SYLMAR_2_LDWP/EPMI	EPMI	Enron	748.21
Jan-00	SYLMAR_2_LDWP/EPMI	EPMI	Enron	746.66
Apr-00	MEAD_2_WALC/EPMI	EPMI	Enron	745.51
May-00	MEAD_2_WALC/EPMI	EPMI	Enron	736.65
Jan-00	PVERDE_5_DEVERS/EPMI	EPMI	Enron	731.31
Jun-00	MEAD_2_WALC/EPMI	EPMI	Enron	726.83
Jun-00	PVERDE_5_DEVERS/EPMI	EPMI	Enron	618.56
Jun-00	SYLMAR_2_NOB/BPA1	BPA1	BPA	530.53
Jul-00	PVERDE_5_DEVERS/EPMI	EPMI	Enron	448.53
Dec-00	LUGO_5_VICTVL/LDWP	LDWP	LADWP	446.15
Jul-00	FCORNR_5_PSUEDO/EPMI	EPMI	Enron	431.41
Jul-00	CASCAD_1_CRAGVW/PWRX	PWRX	Powerex	408.19
Dec-00	ELDORD_5_MCLLGH/LDWP	LDWP	LADWP	401.80
Jun-00	CAPJAK_5_OLINDA/EPMI	EPMI	Enron	394.61
Jun-00	MALIN_5_RNDMTN/BPA1	BPA1	BPA	391.06
Jun-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	380.07

*Units with three or less bids per month and negative bids excluded.

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Figure 3
Top 40 Average Bid Spans*
In-State Generators

MONTH	SC_ID	SC Name	UNIT_ID	AVG BID SPAN ($)
Dec-00	ECH1	Dynegy	ELSEGN_7_UNIT 2	813
Dec-00	ECH1	Dynegy	ELSEGN_7_UNIT 1	778
Dec-00	ECH1	Dynegy	ELSEGN_7_UNIT 3	658
Dec-00	ECH1	Dynegy	LBEACH_6_66TOT	603
Dec-00	ECH1	Dynegy	ELSEGN_7_UNIT 4	590
Mar-00	SCEM	Mirant	POTRPP_7_UNIT 5	465
Mar-00	SCEM	Mirant	POTRPP_7_UNIT 6	460
Mar-00	SCEM	Mirant	POTRPP_7_UNIT 4	439
Jan-00	SCEM	Mirant	PITTSP_7_UNIT 5	415
Feb-00	SCEM	Mirant	POTRPP_7_UNIT 6	406
Feb-00	SCEM	Mirant	POTRPP_7_UNIT 4	395
Apr-00	SCEM	Mirant	PITTSP_7_UNIT 2	382
Apr-00	SCEM	Mirant	PITTSP_7_UNIT 7	364
Feb-00	SCEM	Mirant	POTRPP_7_UNIT 5	361
Jan-00	ECH1	Dynegy	ENCINA_7_EA3	356
Jun-00	ECH1	Dynegy	ENCINA_7_EA1	355
Jan-00	SCEM	Mirant	POTRPP_7_UNIT 6	352
Feb-00	SCEM	Mirant	PITTSP_7_UNIT 6	348
Feb-00	SCEM	Mirant	PITTSP_7_UNIT 1	345
May-00	ECH1	Dynegy	ELSEGN_7_UNIT 1	345
Jan-00	SCEM	Mirant	POTRPP_7_UNIT 5	335
Jan-00	DETM	Duke	SOBAY_7_SY4	333
Mar-00	ECH1	Dynegy	ENCINA_7_EA4	328
Jan-00	SCEM	Mirant	COCOPP_7_UNIT 6	325
Jan-00	SCEM	Mirant	POTRPP_7_UNIT 3	324
Jan-00	SCEM	Mirant	POTRPP_7_UNIT 4	319
Mar-00	SCEM	Mirant	PITTSP_7_UNIT 7	318
Jun-00	ECH1	Dynegy	ELSEGN_7_UNIT 1	317
May-00	ECH1	Dynegy	ENCINA_7_EA2	299
Jan-00	SCEM	Mirant	PITTSP_7_UNIT 1	298
Feb-00	SCEM	Mirant	PITTSP_7_UNIT 2	294
Feb-00	SCEM	Mirant	PITTSP_7_UNIT 5	275
Jun-00	ECH1	Dynegy	ENCINA_7_EA2	267
Apr-00	SCEM	Mirant	PITTSP_7_UNIT 5	261
Jun-00	ECH1	Dynegy	ENCINA_7_EA5	257
Dec-00	NES1	Reliant	ETIWND_7_UNIT 4	254
May-00	SCEM	Mirant	PITTSP_7_UNIT 1	247
Apr-00	SCEM	Mirant	POTRPP_7_UNIT 6	244
Feb-00	ECH1	Dynegy	ENCINA_7_EA3	242
Jun-00	ECH1	Dynegy	KEARNY_7_KY2	242

*Units with three or less bids per month and negative bids excluded.

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Figure 4
Top 25 Average Bid Spans*
Importers

MONTH	TIEPOINT_SC_ID	SC_ID	SC Name	AVG BID SPAN ($)
Jan-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	680
May-00	MALIN_5_RNDMTN/PWRX	PWRX	Powerex	568
Feb-00	MALIN_5_RNDMTN/PWRX	PWRX	Powerex	566
Jun-00	MALIN_5_RNDMTN/PWRX	PWRX	Powerex	488
Jan-00	MALIN_5_RNDMTN/PWRX	PWRX	Powerex	485
Jun-00	MEAD_2_WALC/LDWP	LDWP	LADWP	475
Jun-00	LUGO_5_VICTVL/LDWP	LDWP	LADWP	467
Feb-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	441
Apr-00	MALIN_5_RNDMTN/PWRX	PWRX	Powerex	424
May-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	400
Jun-00	PVERDE_5_DEVERS/LDWP	LDWP	LADWP	357
Apr-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	353
Jun-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	342
Mar-00	MALIN_5_RNDMTN/PWRX	PWRX	Powerex	267
Jul-00	LUGO_5_VICTVL/LDWP	LDWP	LADWP	261
Jul-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	244
Mar-00	SYLMAR_2_NOB/PWRX	PWRX	Powerex	241
Jul-00	MALIN_5_RNDMTN/PWRX	PWRX	Powerex	207
Jul-00	MEAD_2_WALC/LDWP	LDWP	LADWP	189
May-00	LUGO_5_VICTVL/LDWP	LDWP	LADWP	160
Apr-00	MEAD_2_WALC/LDWP	LDWP	LADWP	159
May-00	MEAD_2_WALC/LDWP	LDWP	LADWP	129
Jan-00	LUGO_5_VICTVL/LDWP	LDWP	LADWP	123
Mar-00	MEAD_2_WALC/LDWP	LDWP	LADWP	98
Mar-00	LUGO_5_VICTVL/LDWP	LDWP	LADWP	98

*Units with three or less bids per month and negative bids excluded.

Q. Do the average bid prices in Figures 1 and 2 reflect costs?

A. The FERC has already determined that prices like those seen in Figure 1 do not represent costs for the October 2, 2000 - June 19, 2001 period. They are far above an estimation of costs based on unit heat rates, gas and O&M expenses, and a credit risk adder. The FERC, however, has not yet considered anti-

1 competitive bidding practices that resulted in excessive market prices prior to
2 October 2, 2000.

3 Q. Do you have any evidence that bid prices in the summer of 2000 did not reflect
4 costs?

5 A. Yes, for many units, there is evidence that bid prices in May and June 2000
6 exceeded costs by at least $500 and that prices in July 2000 exceeded costs by at
7 least $250. The evidence is borne out by sellers' actions in response to
8 increasingly lower ISO price caps during the June - August 2000 period. Many
9 sellers offered their gas-fired units into the real time market at prices that were
10 less than or equal to $250 in the months of August and September. The fact that
11 sellers were willing to offer this supply into the market at these prices reveals
12 that the costs of production of these units must have been less than or equal to
13 $250. The costs of production were, if anything, less in May and June than they
14 were in August and September. Gas prices and emissions permit prices, the two
15 primary production costs, were lower. Thus, there can be no cost based
16 explanation for bid prices for gas-fired units above $250 in May, June, and July
17 when bid prices were less than or equal to $250 in August and September for the
18 same units. Mr. Hanser makes a similar determination in his testimony, Exh.
19 No. CA-9, and provides a comparison of marginal costs and bid prices that
20 further supports this conclusion.

21 Q. Is this true for non-gas fired units?

22 A. Non-gas fired units, in particular hydro units, will incorporate opportunity costs
23 into their real time bids.[4] These opportunity costs will depend upon expectations

[4] Since hydro units are energy limited, producing less in one day allows them to produce more on another. Hydro units will be bid in a way to supply energy on peak when prices are greatest. Expected market clearing prices on peak will therefore be incorporated into the bid price.

of market clearing prices. A cost calculation for hydro units would necessarily require a more complex analysis.

Q. Do you have an example of the bidding patterns that you described for gas-fired units?

A. Yes, Alamitos Unit 3, a Williams unit, was bid into the real time market at an average price of $749.09 in May 2000 and at an average price of $139.57 in September 2000. The unit was bid into the market in about the same percentage of hours in each month; during 40% of the hours in May and during 35% of the hours in September. If Williams was willing to bid Alamitos Unit 3 into the real time market at an average price of $139.57 in September 2000, then the costs to produce energy from the unit must have been less than or equal to $139.57 on average. Therefore, the bids in May 2000 at near $750 must have overstated costs by more than $600 on average.

Q. What has the FERC concluded about hockey stick bidding?

A. In its April 26, 2001 Order, *San Diego Gas & Electric Company, et al.*, 95 FERC ¶ 61,115 at 61,360 (2001) (April 26 Order), FERC found hockey stick bidding to be anti-competitive and prohibited such behavior.

> First, bids that vary with unit output in a way that is unrelated to the known performance characteristics of the unit are prohibited. An example of this bidding practice is the so-called "hockey stick" bid where the last megawatts bid from a unit are bid at an excessively high price relative to the bid(s) on the other capacity from the unit.

Q. Has the FERC found any other types of bidding behavior to be anti-competitive?

A. Yes. The FERC also concluded in the same Order that bids that

> vary over time in a manner that appears unrelated to change in the unit's performance or to changes in the supply environment that would induce additional risk or other adverse shifts in the cost basis [are anti-competitive]. An example of this is a bid that appears to change only in response to increased demand or reduced reserve margins, particularly if the timing of the bid is related to public announcements of system conditions or to timing of outages in a participant's portfolio.
> *Id.*

Q. Did you find evidence of bidding behavior unrelated to a unit's performance or that changed in response to increased demand or reduced reserve margins?

A. There are numerous examples of this kind of bidding behavior during the relevant period. They are described in more detail in the sections of my testimony that discuss individual in-state generators and importers. Day-to-day bid variability consists of three basic bidding patterns: bid price spikes, the absence of bids or a "no bid" strategy, and prolonged elevation of bid prices. Bid price spikes are defined as a dramatic increase in bid prices for a few hours or up to several days. I have not defined an exact increase in bid prices that would constitute a spike. Rather, I have looked carefully at the data and chosen the most prominent examples. These bid price spikes tend to be in the hundreds of dollars. Prolonged elevation of bids is similar to price spikes - except that the bid prices stay elevated for a longer period of time.

I have examined bid price spikes both at a unit level, and at the scheduling coordinator (or seller) level. An example of a bid price spike at the unit level is found in Figure 5 for Dynegy's Encina Unit 4 in June of 2000,

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Figure 5

ENCINA_7_EA4
Real Time Bid Prices
(average hourly)

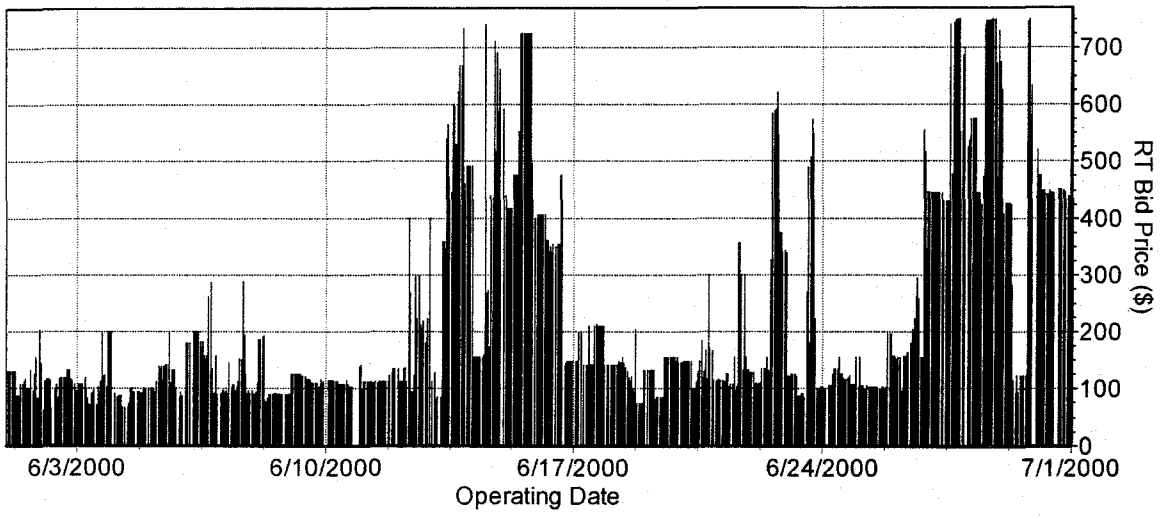

Figure 5 shows that on June 13, 14, 15, 27, 28, and 29, 2000 bid prices were near cap levels and that on June 22 and 23, 2000 bid prices were near $600. These instances clearly stand out in the graph as price spikes. During non-spike hours, bid prices were closer to the $100 level.

Q. In your example, was there a change in system conditions such as increased demand or a reduction in the reserve margin on the days that the price spikes occurred?

A. In June 2000, the ISO declared a system emergency on six different days; June 13, 14, 26, 27, 28, and 29, 2000. During those days, the ISO had a shortage of reserves.[5] On June 15, 22, and 23, 2000—also days where price spikes are observed in Figure 5 above—the ISO did not have a shortage of reserves. As a

[5] There are three levels of ISO emergencies; Stage 1, 2, and 3, that are defined by successively higher levels of operating reserve shortfall. The precise definitions can be found on the ISO's web site, www.caiso.com.

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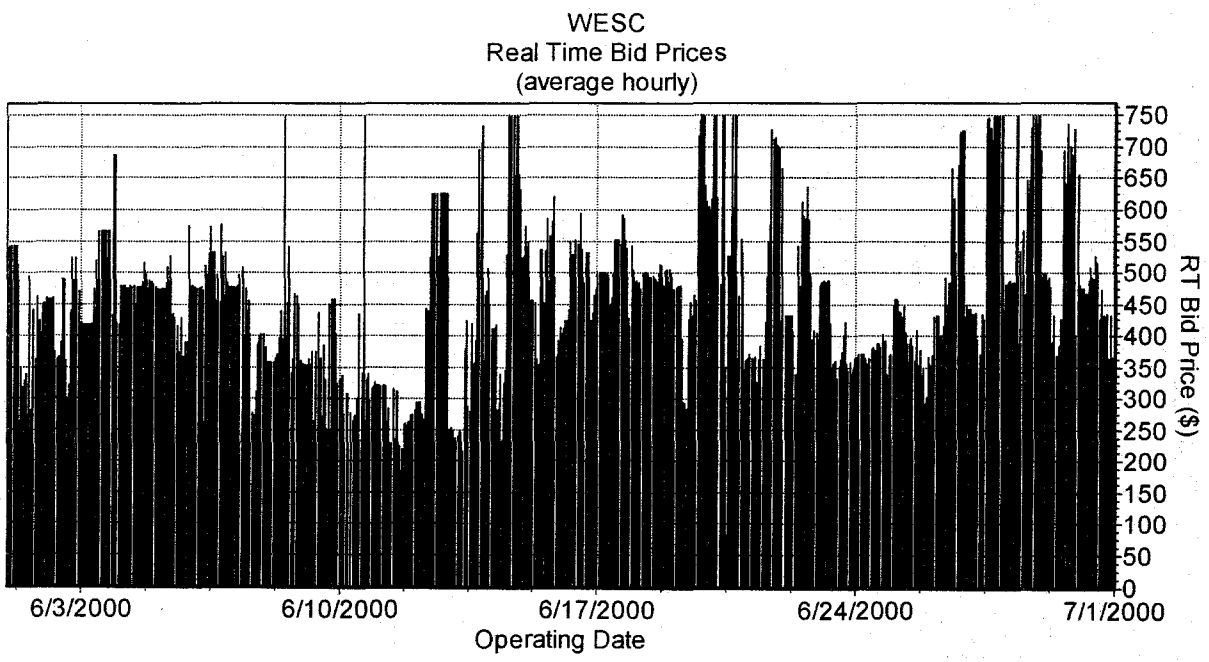
result, I cannot readily tell if these spikes were associated with changes in system conditions.

Q. Do you have an example of bid price spikes on a scheduling coordinator or seller level?

A. Yes. Figure 6 shows the hourly average bid prices for all of the Williams units that were bid into the real time market in June 2000. Looking at June 14, 2000 for example, one can see that the average of all bids (and all segments of all bids) reached the $750 cap for several hours.

Figure 6



In June 2000, Williams clearly had bid price spikes on June 3, 12, 13, 14, 20, 21, 22, 26, 27, 28, and 29. There were also price spikes on June 8 and 10 for one hour. Notably, these bid price spikes occurred during every emergency day in June 2000.

1 Q. Generally speaking, what is the significance of bid price spikes?

2 A. Bid price spikes are a blatant attempt by a seller to drive up market clearing
3 prices. Bid price spikes remove energy from the market that would otherwise be
4 available at lower prices. When the ISO is short of energy, and must move
5 quickly through the BEEP stack, bid price spikes force the ISO to dispatch the
6 highest priced bids. During those hours when several large sellers bid price
7 spikes into the real time market simultaneously, it is almost inevitable that the
8 ISO will dispatch the spiked energy bids.

9 Q. You have given examples of bid price spikes. How pervasive was this practice?

10 A. Submitting bid price spikes into the real time market was a bidding strategy that
11 was used predominantly in May, June, and July 2000 by in-state generators and
12 importers alike. After ISO price caps were lowered to $250 on August 7, a
13 pattern of bid price spikes is not discernable. After the implementation of the
14 $250 soft cap on December 8, 2000 the pattern of bid price spikes reemerged.

15 Q. During the May 1, 2000 to August 7, 2000 period, did sellers submit bid price
16 spikes during emergencies?

17 A. Bid price spikes were submitted during every emergency day in this period.
18 Figure 7 shows each emergency date and the sellers that submitted bid price
19 spikes on that date.

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1 **Figure 7**

Sellers that Submitted Bid Price Spikes During California ISO Declared Emergencies*

May 1, 2000 - August 6, 2000

Emergency Date	Sellers That Submitted Price Spike or Elevated Bids into the Real Time Market
5/22/2000	Williams, Dynegy, Mirant, Reliant, Powerex, LADWP, Idaho Power
6/13/2000	Williams, Dynegy, Mirant, Reliant, Powerex, BPA
6/14/2000	Williams, Dynegy, Reliant, Powerex, LADWP, Idaho Power, BPA
6/26/2000	Williams, Dynegy, Mirant, Reliant, Powerex, Idaho Power
6/27/2000	Williams, Dynegy, Mirant, Reliant, Powerex, LADWP, Idaho Power
6/28/2000	Williams, Dynegy, Mirant, Reliant, LADWP, Idaho Power, BPA
6/29/2000	Williams, Dynegy, Reliant, LADWP, Idaho Power, BPA
7/19/2000	Williams, Dynegy, Reliant, Idaho Power
7/20/2000	Williams, Dynegy, Reliant
7/24/2000	Williams, LADWP
7/25/2000	Williams, Dynegy, Reliant, LADWP
7/28/2000	Dynegy, Mirant
7/31/2000	Williams, Dynegy, Powerex, Idaho Power
8/1/2000	Williams, Dynegy, Reliant, Powerex, LADWP, Idaho Power
8/2/2000	Williams, Dynegy, Mirant, Reliant, LADWP, Idaho Power
8/3/2000	Dynegy, Mirant, LADWP, Idaho Power
8/4/2000	Dynegy, LADWP, Idaho Power

*Bid price spikes occurred during one or more hours on the day of the ISO declared emergency.

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3 Q. What effect did this bidding behavior have on the ISO emergency?

4 A. When such a large number of sellers are spiking the prices on all their bids, the
5 effect can only be to dramatically raise prices. Since these bid price spikes were
6 for the most part unrelated to the underlying costs of production, the resulting
7 high market clearing prices during emergencies had nothing to do with system
8 marginal cost. Moreover, in many instances, bid price spikes occurred at the
9 same time that the same sellers were reducing the MWhs bid into the market.
10 By withdrawing bids prior to emergencies, certain sellers appear to have
11 attempted to cause an emergency - perhaps when reserve margins appeared thin.
12 In other words, sellers would see potential opportunities, and then withhold

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1 power to create a perception of true scarcity. This behavior pattern is explained
2 further in the later sections of my testimony that address individual sellers.

3 Q. Did sellers submit bid price spikes on non-emergency days?

4 A. Yes. On numerous occasions, two or more sellers submitted bid price spikes on
5 non-emergency days. This occurred during May 2-6, May 28, 30-31, June 20-
6 24, July 2, July 7, and July 12-16, 2000. Figure 8 lists the sellers who submitted
7 bid price spikes on those days.

8 **Figure 8**

Sellers that Submitted Bid Price Spikes During Non-Emergency Days*

Date	Sellers That Submitted Price Spike or Elevated Bids into the Real Time Market
5/2/2000	Mirant, LADWP
5/3/2000	Williams, Mirant, Powerex, LADWP
5/4/2000	Williams, Dynegy, Mirant, Powerex, LADWP
5/5/2000	Williams, Dynegy, Mirant, LADWP
5/6/2000	Williams, LADWP
5/28/2000	Mirant, Powerex
5/30/2000	Dynegy, Powerex,
5/31/2000	Dynegy, Mirant, Powerex, LADWP, BPA
6/20/2000	Williams, Dynegy, Powerex
6/21/2000	Williams, Dynegy, Mirant, Reliant, Powerex, Idaho Power
6/22/2000	Williams, Dynegy, Reliant, Powerex
6/23/2000	Dynegy, Powerex
6/24/2000	Dynegy, Mirant, Idaho Power
7/2/2000	Dynegy, LADWP
7/7/2000	Williams, Idaho Power, Powerex
7/12/2000	Dynegy, Idaho Power
7/13/2000	Williams, Dynegy
7/14/2000	Williams, Dynegy, Mirant
7/15/2000	Reliant, Powerex
7/16/2000	Reliant, Powerex

*Spikes do not occur in every hour.

Q. How do you explain this apparently coordinated behavior?

A. During emergency periods, sellers had access to information about reserve deficiencies or system load, and they most likely responded to that information by raising prices. For example, in a Mirant e-mail dated July 24, 2000, the sender exclaims,

> J-Man, Load is avg above 40,000 during peek. So, submit revised supp bids and "stick-it to "em!!![6]

The reserve deficiency information was the mechanism that facilitated the coordination. As such, this was an example of tacit collusion. Sellers act like a cartel without explicitly coordinating their actions.[7]

On the non-emergency days, there could have been some other public piece of information that provided the coordinating mechanism. Alternatively sellers could have had access to some private information that facilitated the coordination. There is evidence that certain sellers were subscribers to a detailed outage publication produced by Industrial Information Resources (IIR). IIR also provided up-to-date information on request regarding unit conditions at competitors' plants.[8] Such information could certainly have provided a coordination mechanism for bid price spikes.

Q. Please explain more fully the "no bid" strategy.

A. There are numerous instances of periods during which no bids are submitted into the real time market for a particular unit or for a particular seller (no bids for a

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[6] Exh. No. CA-141.
[7] Exh. No. CA-126 contains a news article documenting information flows between traders.
[8] Details of IIR, the services it provided and its subscriber base can be found in the testimony of Dr. Peter Fox-Penner, Exh. No. CA-1.

1 seller implies that no bids were submitted for any unit). There are legitimate
2 reasons for not submitting bids—a unit may be down for maintenance or the
3 output of a unit may already be fully scheduled. However, I have found that in
4 numerous instances bids were not submitted for units that were available or were
5 not fully scheduled. Moreover, in numerous instances there was a period of "no
6 bids" precisely before bid price spikes were submitted into the real time market.
7 And this frequently occurred around ISO emergencies. Thus, there is a pattern
8 to "not bidding", just as there is a pattern to bid price spikes.[9]

9 Q. How is the remainder of your testimony organized?

10 A. In the next 10 sections I examine the bidding behavior of each in-state generator;
11 Reliant, Mirant, Dynegy, Williams and Duke, and each importer; Enron,
12 Powerex, LADWP, Idaho Power, and BPA, in detail. For the in-state generators
13 I concentrate on their bidding behavior during the summer of 2000.[10] For
14 importers I look, in general, at all of 2000. The last section of my testimony
15 addresses energy exchange transactions.

16 IV. IN-STATE GENERATION OWNERS: RELIANT (NES1)

17 A. General Trends

18 Q. What were Reliant's bidding patterns over the summer 2000?

19 A. In general, from May through September 2000, Reliant's average bid prices were
20 high, but not as high as in-state generators Williams, Dynegy, and Mirant.

[9] The testimony of Dr. Reynolds (Exh. No. CA-5) contains an analysis that shows that the in-state generators frequently did not bid capacity that a competitive firm would have bid. He shows that high levels of capacity were not bid even though the units were: (a) not on outage, (b) not on reserve shutdown, (c) not unproducible due to ramping constraints, and (d) did not have a marginal cost above the maximum allowable bid in the CAISO real-time market.

[10] A list of units owned by Reliant, Mirant, Dynegy, Williams, and Duke, and the units' operating characteristics can be found in the testimony of Dr. Reynolds, CA-5 at 28-29 (Figures 6 and 7).

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There were, however, particularly high bids submitted for its Etiwanda Unit 5, Mandalay Unit 3, and Ellwood units during the summer period and for all units in general in the month of June. Figure 9 below provides a summary of the average bid prices for Reliant's units.

Figure 9
Reliant Units
Average BEEP Stack Bid Prices ($)

	May-00	Jun-00	Jul-00	Aug-00	Sep-00
CWATER_7_UNIT 1	46.89	265.94	138.52	135.80	115.35
CWATER_7_UNIT 2	63.83	176.68	219.35	114.03	120.65
CWATER_7_UNIT 3	n.a.	557.48	142.62	106.70	117.98
CWATER_7_UNIT 4	119.42	203.84	168.56	114.00	125.52
ETIWND_7_UNIT 1	82.49	371.18	204.25	132.19	170.67
ETIWND_7_UNIT 2	110.69	394.10	174.23	145.07	176.03
ETIWND_7_UNIT 3	71.40	217.67	149.54	148.66	157.48
ETIWND_7_UNIT 4	109.90	208.48	194.21	147.76	168.56
ETIWND_7_UNIT 5	297.53	413.63	366.87	219.87	232.34
GOLETA_6_ELLWOD	304.47	440.63	376.49	n.a.	n.a.
MNDALY_7_UNIT 1	80.07	210.17	189.67	138.46	122.57
MNDALY_7_UNIT 2	102.15	222.40	195.02	158.20	137.00
MNDALY_7_UNIT 3	408.42	557.23	431.99	232.98	238.19
MRCHNT_2_PLANT	n.a.	31.97	42.46	n.a.	131.46
ORMOND_7_UNIT 1	279.37	268.65	224.41	175.44	180.54
ORMOND_7_UNIT 2	126.50	307.06	260.85	203.93	191.46

Q. Did Reliant submit hockey stick bids?

A. Reliant submitted pronounced hockey stick bids for four of its units during the May – July period. Average bid spans (price difference between the lowest priced bid segment and highest priced bid segment) of these units are listed below in Figure 10:

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Figure 10
Reliant Units
Average Bid Span ($)*

UNIT_ID	MAY	JUNE	JULY
ETIWND_7_UNIT 5	156	159	104
MNDALY_7_UNIT 3	175	186	107
ORMOND_7_UNIT 1	100	109	78
ORMOND_7_UNIT 2	78	134	99

*July includes the first six days of August to account for the changes in the price cap.

B. May 2000

Q. What were Reliant's bidding patterns in May 2000?

A. In May, there are pronounced bid price spikes on 3 days: May 22 (ISO declared emergency), May 23, and May 24. During these episodes, Reliant increased the bid prices on all or on a large number of the units that were bid into the real time market.

Notably, the Etiwanda Units 1, 2, 4, and 5 were not bid into the market during the week prior to the May 22 emergency, but then were bid in at elevated prices during the emergency. Etiwanda Units 1, 2, and 4 were available prior to the emergency, and could have been bid into the real time market. Etiwanda Unit 5 was reported unavailable from May 8-19.

Q. Were there other instances where Reliant units were not bid into the market?

A. There were two periods in May during which no bids were submitted for any unit. This occurred for a period of hours on May 21 that continued into May 22 (leading up to the May 22 emergency), and for a period of hours that commenced on May 23 and continued into May 24. Both periods of no bidding preceded price spikes.

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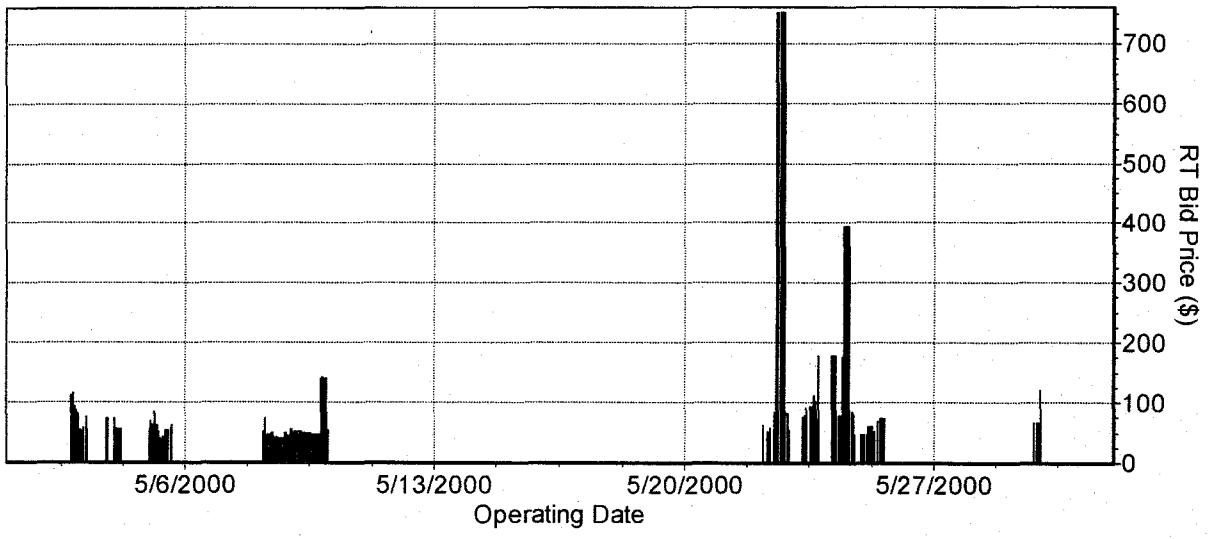
Q. Do you have an illustration of this?

A. Figure 11 shows the bid prices of Etiwanda Unit 1. You can see that there is a period of no bidding followed by elevated bids during the ISO declared emergency on May 22, 2000.

Figure 11

ETIWND_7_UNIT 1
Real Time Bid Prices
(average hourly)



C. June and July 2000

Q. What were Reliant's bidding patterns in June and July 2000?

A. In June, there were pronounced bid price spikes on June 13 (ISO declared emergency), June 14 (ISO declared emergency), June 21 (Reliant market manipulation), June 22 (Reliant market manipulation), June 26 (ISO declared emergency), June 27 (ISO declared emergency), June 28 (ISO declared emergency), June 29 (ISO declared emergency), and June 30. During these episodes, Reliant increased the bid prices on all or a large number of its units

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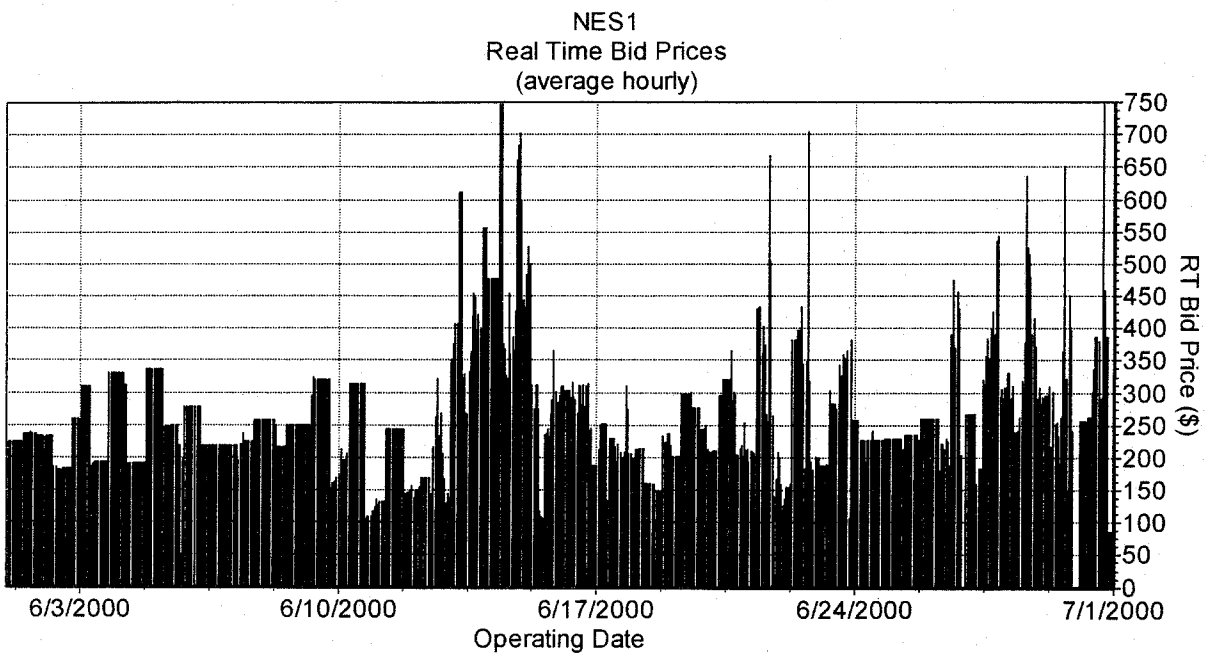
that were bid into the real time market. Figure 12 shows Reliant's hourly average bid prices in June.

Figure 12



In July 2000, there were four instances of pronounced bid price spikes on July 15-16, July 19-20 (ISO declared emergency), July 25 (ISO declared emergency) and July 27. In addition, there was a period of hours on July 1 where no bids are submitted for any unit.

Q. Do you have examples of the bidding behavior for an individual Reliant unit during June and July, 2000?

A. Yes. Figure 13 shows the hourly average bid prices of Etiwanda Unit 5 in June. It shows that the bid prices were close or equal to the cap of $750 during ISO emergencies on June 13-14 and June 26-29, and during the June 20-23 period. Figure 14 shows the hourly average bid prices of Ormond Beach Unit 1, a 724

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MW base load unit, in July. The bidding behavior of both units can be seen to be intermittent with numerous short periods during which no bids are submitted.

Figure 13

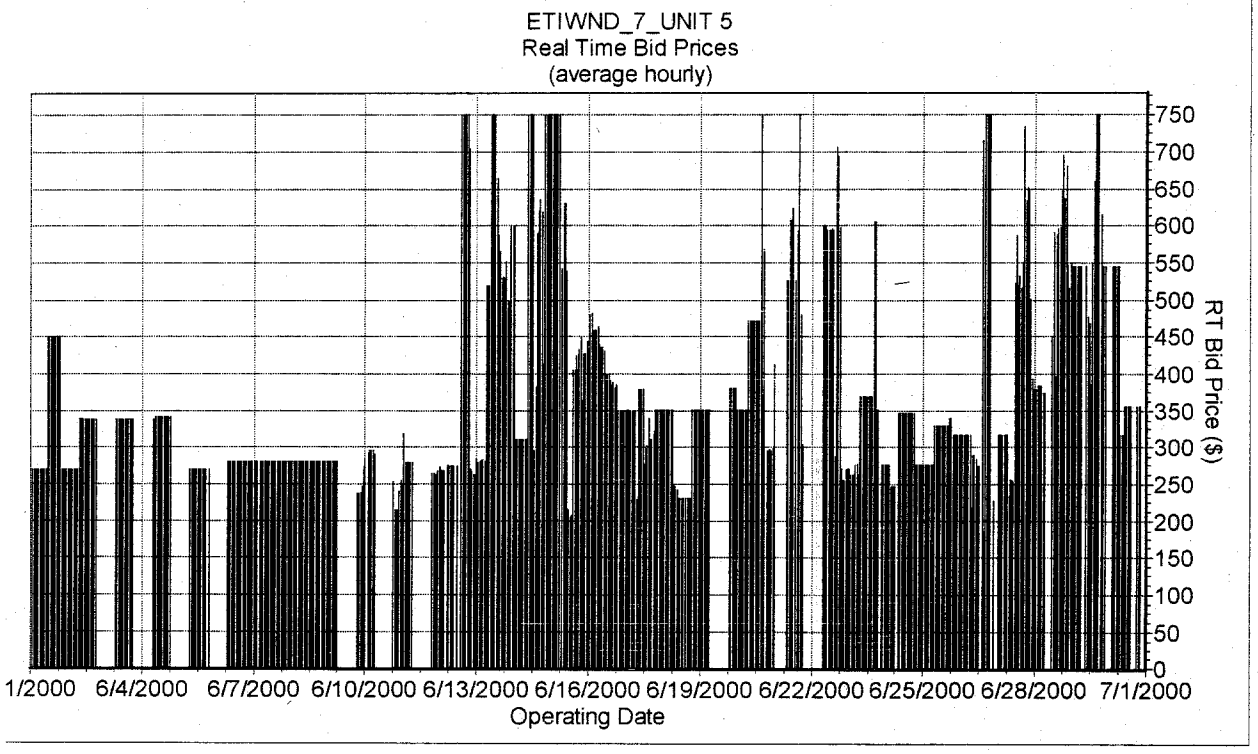

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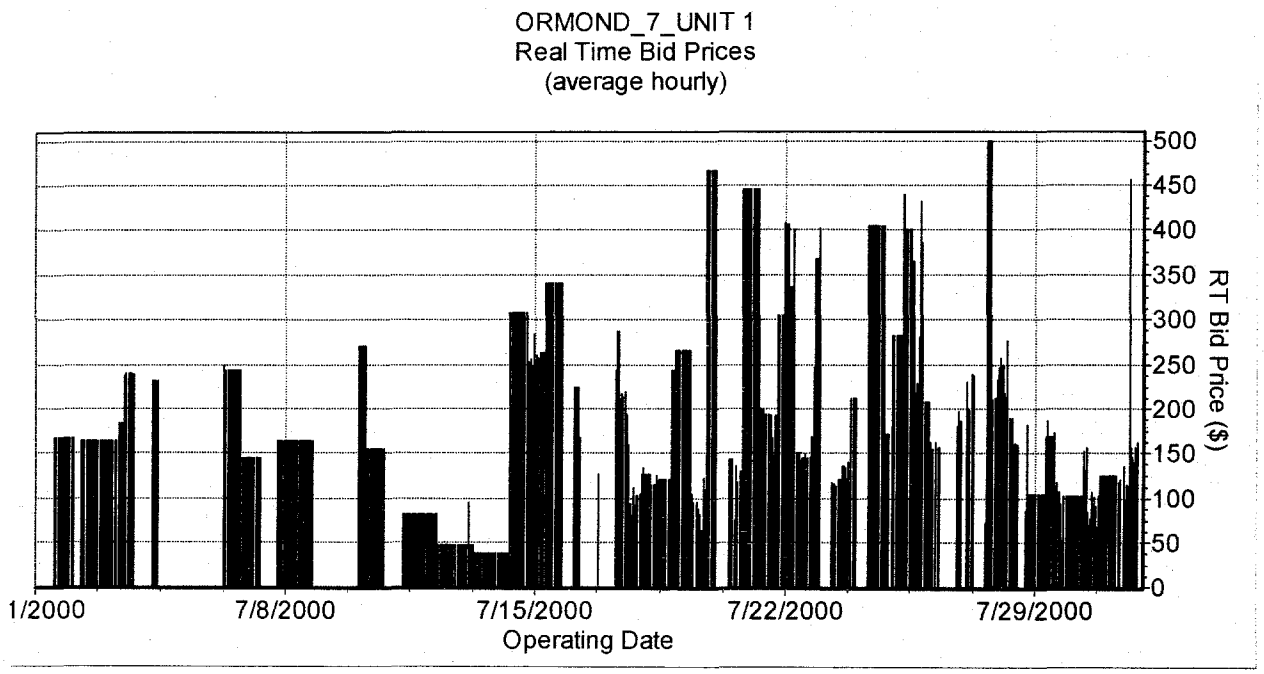
Figure 14



D. Reliant Manipulation on June 21-22, 2000

Q. Figures 13 and 14 show that there were bid price spikes on June 21 and June 22, 2000. What is unique about these two days?

A. These were the days that Reliant was found to have withheld energy from the PX day-ahead market. *See Order Approving Stipulation and Consent Agreement*, 102 FERC ¶ 61,108 (2003) (January 31 Order). Notably, Reliant's market manipulation on June 21-22, which involved withholding capacity from the PX day-ahead market, also involved bid price spikes in the real time market. Manipulation of the ISO real time market was not considered by FERC Staff in its settlement with Reliant.

Q. Were there other factors that were not considered by FERC in its settlement with Reliant?

1 A. Yes. FERC did not consider the impact that manipulation in the PX day-ahead
2 market had on all other markets. In addition to ignoring the impacts on the real
3 time market, FERC did not consider the effect that reduced capacity had on the
4 ancillary services markets and the forward markets. The latter omission is
5 significant as the public transcripts that FERC released with its order contained
6 explicit discussions of Reliant traders revealing their intention to drive up
7 forward prices in order increase the profitability of their forward positions, and
8 their success in doing so.

9 Q. Are there any other factors that FERC did not consider in the January 31 Order?

10 A. Yes, at the same time that Reliant reduced supply into the PX day-ahead market,
11 it also submitted a price taker demand curve into the PX day-ahead market on
12 both June 21 and 22, 2000. This was the first time during the January 1, 2000 to
13 June 20, 2001 period that Reliant submitted a demand curve into the PX day-
14 ahead market.

15 Q. Why is it significant that Reliant submitted a price taker demand curve into PX
16 day-ahead market on June 21-22, 2000?

17 A. Because, in doing so, Reliant further reduced the day-ahead supply into the PX.
18 The FERC calculated the effect that reducing supply had on the market price, but
19 failed to consider the effects on price of the further reduction in supply resulting
20 from the submission of the demand curve. A remedy based on gross supply will
21 fall short of an appropriate measure of damages, even in the limited application
22 applied by FERC. Figure 15 shows the supply and demand curves submitted by
23 Reliant into the PX day-ahead market on June 21 and 22, 2000. At a price of
24 $500, based on the gross supply curves, Reliant offered 7 MWhs on June 21 and
25 350 on June 22. In reality, however, based on the *net* supply curve at a price of

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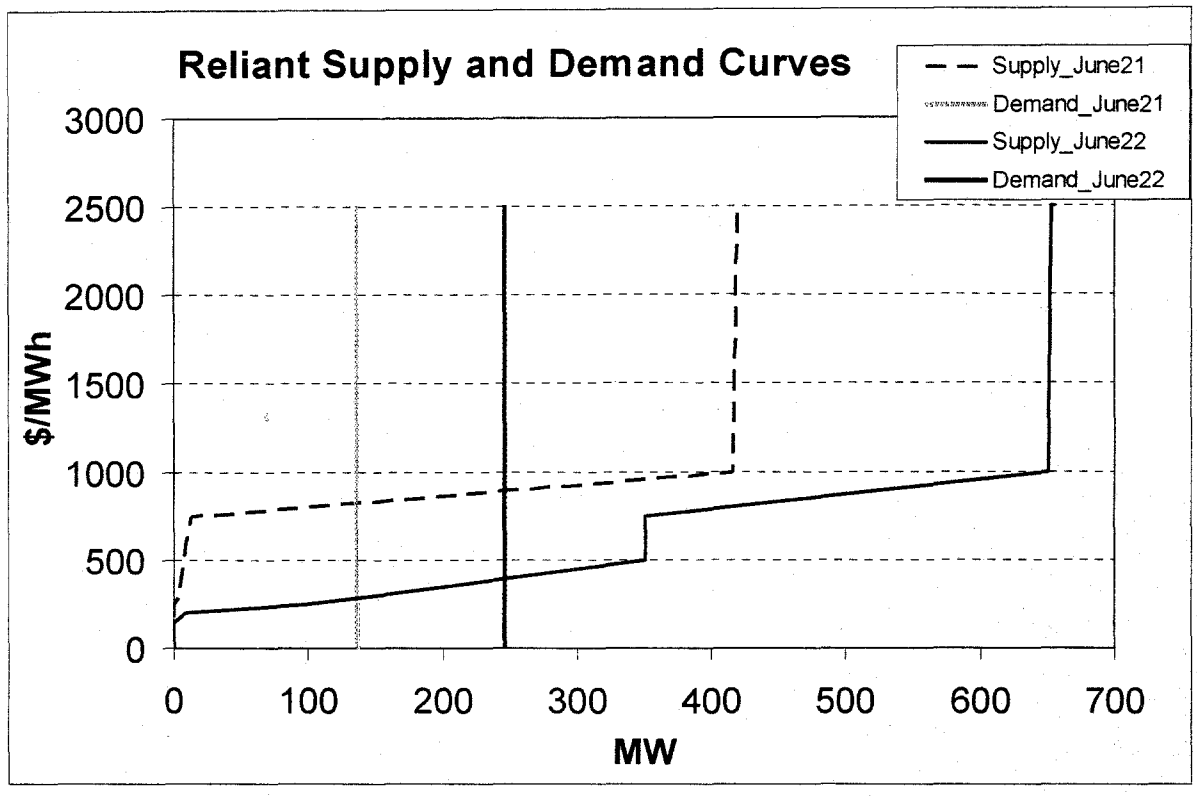
$500, Reliant removed supply from the day-ahead market on June 21—supply is -129 (minus 129) MWhs—and offered only 105 MWhs (as opposed to the 350 MWhs) on June 22.

Figure 15



Q. Was Reliant's net supply curve in the PX day-ahead market significantly different in the days before and after June 21 and June 22, 2000?

A. Yes. The average net supply curves in the five business days preceding June 21 and in the five business day following June 22 were shifted significantly to the right in Figure 16. This shift reflects that Reliant offered significantly more energy into the PX day-ahead market both prior to and following the June 21-22 period. This is shown in Figure 16.

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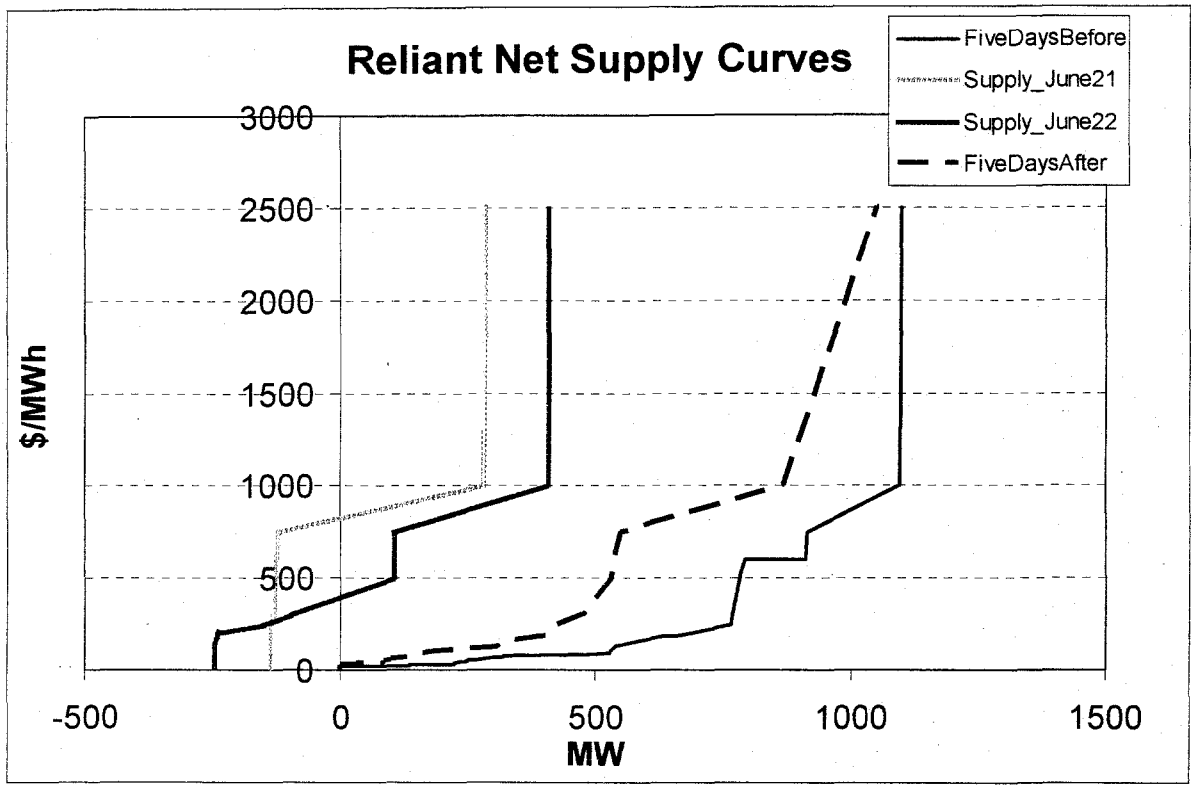
Figure 16



Q. The FERC calculated that buyers in the PX day-ahead market paid an excess of $13.8 million for energy as a result of the Reliant manipulation. How would this number change if the net supply curve as opposed to the gross supply curve were used in this calculation?

A. The same calculation based on the net supply curve would result in excess charges of $16 million, an increase of $2.2 million due to buyers.

Q. Did Reliant submit price taker demand curves into the PX day-ahead market on any other days during the summer of 2000?

A. Yes. Reliant bid load into the PX day-ahead market on July 19-20, 2000. Reliant submitted a price taker bid to buy 400 MWh on July 19, and 925 MWh on July 20.

Q. Did you find any further evidence regarding the Reliant manipulation on June 21-22?

A. Yes. A transcript of phone conversations between Reliant traders Ryan and George on June 20, 2000 indicate that an individual by the name of Reggie told them to tell the ISO that their units would not be running (on June 21) because they did not clear the day-ahead market. We know now that they were never bid into the day-ahead market.[11]

PERSON 1: Reliant Energy, George.
PERSON 2: George, hey it's Ryan.
PERSON 1: Hey, Ryan.
PERSON 2: Hey, I forgot to tell you. Reggie wanted me to make sure and tell you, if the ISO calls and asks about our units being off tomorrow --
PERSON 1: Uh-huh.
PERSON 2: -- just tell them that it didn't clear in the market, in the day-ahead market.
PERSON 1: And that they're available?
PERSON 2: Yeah. You can tell them they're available because they are.
PERSON 1: Okay.
PERSON 2: But he just said give them as little information as possible.
PERSON 1: Okay. Okay. Great. I appreciate it, bud.
PERSON 2: Yeah. Just tell them that it didn't clear in the market.
PERSON 1: Okay. Elwood's off. Everything is up to snuff. We're covered.

[11] Another telephone transcript obtained by Cal Parties appears to contain the conversation with Reggie that preceded the conversation quoted here. *See* Exh. No. CA-296 at 27.

PERSON 2: Did they call on Mandolay 3?
PERSON 1: No.
PERSON 2: Oh, good. Good deal.
PERSON 1: Yeah. Prices are beginning to come off.
PERSON 2: Okay. Cool. All right. Talk to you tomorrow.[12]

Q. Other than Reliant, were there other sellers that either spiked their bids into the real time market on June 21 and June 22, 2000 or withdrew supply from the day-ahead market?

A. The answer to both questions is yes. The sellers that submitted bid price spikes for all or a large number of the units that they bid into the real time market on June 21 and June 22, 2000 are listed in Figure 7. On June 21, Williams, Dynegy, Mirant, Powerex, and Idaho Power submitted spikes. On June 22, Williams, Dynegy and Powerex submitted spikes. In the PX day-ahead market, Williams, Dynegy, and Mirant clearly reduced supply on those two days. The following Figures 17-19 compare each of these seller's PX day-ahead supply curves on June 21 and June 22 to their an average supply curve based on the previous five business days (labeled on the graphs as "WeekAgo").

[12] Exh. No. CA-198.

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Figure 17

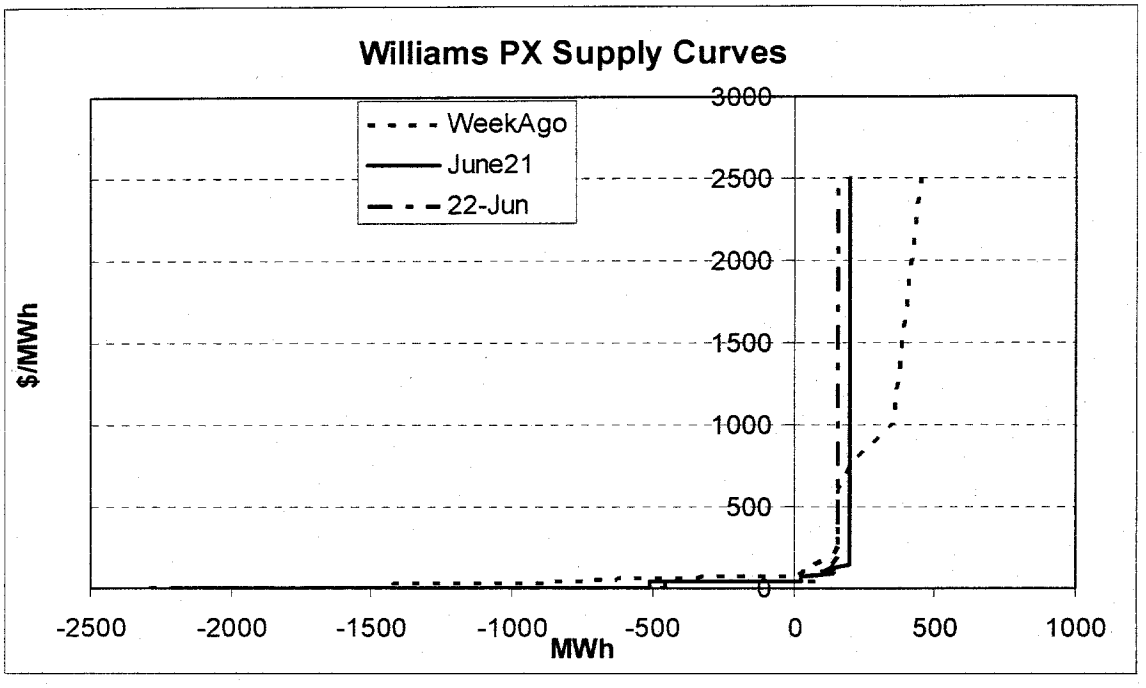

Figure 18

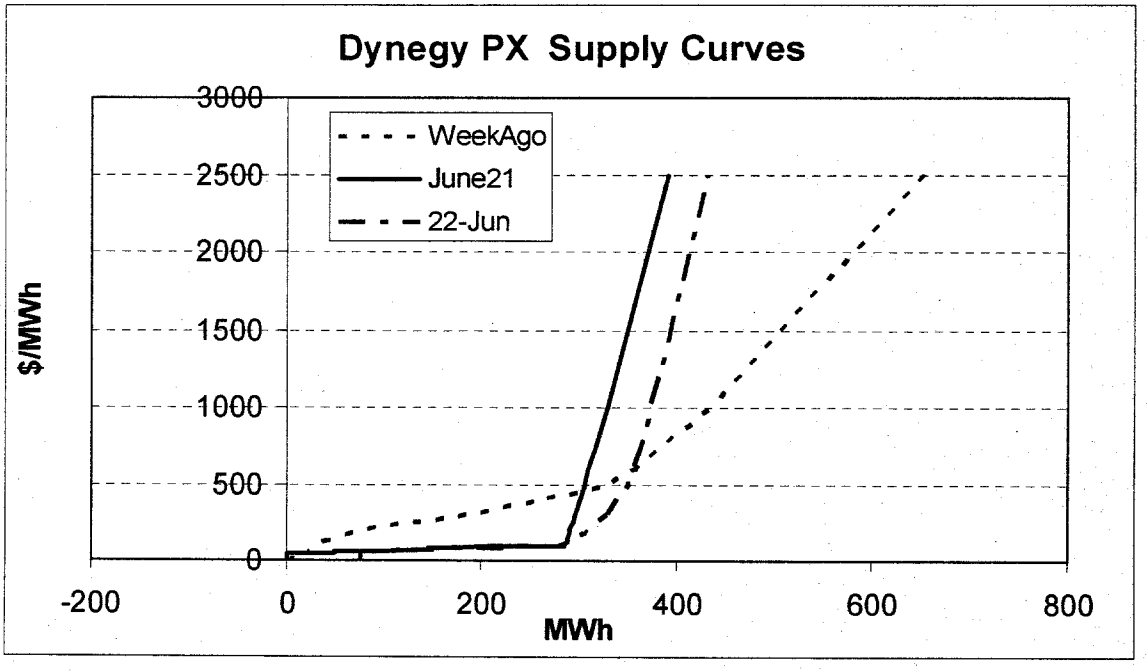

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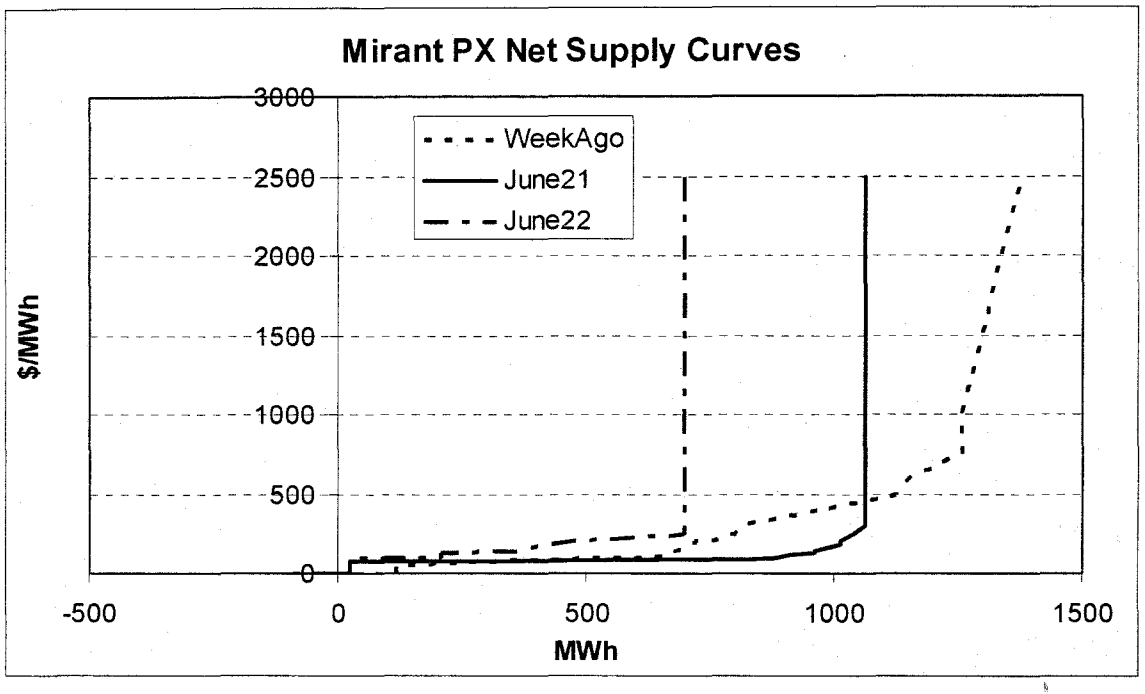
Figure 19



Q. What do the day-ahead and real time bidding patterns indicate?

A. It is highly unlikely that the simultaneous change in day-ahead and real time bidding patterns is a coincidence. It is highly likely that sellers had information about each others intended supply offers.

Q: Is there evidence that other market participants knew about Reliant's manipulation prior to June 21, 2000?

A: Yes. Through discovery the California Parties have identified a 6/20/2000 phone call between Reliant trader Joe Knauth and a trader from another company. Although neither the second trader nor the second firm is identified in this particular conversation, it appears probable, based on a review of additional conversations, that the second trader is Byron Biggs from Amoco Energy

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Trading. In the conversation, the Reliant trader Joe Knauth informs the second trader that Reliant will be bring down some of their units, and that the second trader should expect higher real-time prices.

JOE: Our plants are going to turn some shit back down.
BYRON: They are?
JOE: Yeah. Uh --
BYRON: The f____ market is so sensitive. I mean, yesterday they're chugging along, and all of a sudden, popped up to 700.
[SPEAKER IN BACKGROUND]: 975, one thou.
JOE: Yeah.
BYRON: I mean, I guarantee it won't take much to get this market [inaudible] three, four hundred bucks.
JOE: Yeah.
BYRON: Why are they -- are they turning it down for -- just for price -- economic reasons?
JOE: No.
BYRON: Are they --
JOE: Uh, well, besides the -- the f_____ NOx and shit like that --
BYRON: Uh-huh.
JOE: -- uh, they'd been using these plants so much they don't want to wear them down.
BYRON: Really.
JOE: And, uh, also, uh, it doesn't help us if prices are low.
BYRON: Right.
JOE: See what I'm saying?
BYRON: Yeah.
JOE: So, you can use that any way you want. But I definitely think in, uh, real time it will affect it the most.
[SPEAKER IN BACKGROUND]: 875, nine and a quarter.
BYRON: They going to do it today?
[SPEAKER IN BACKGROUND]: Looking for a thou [inaudible].
JOE: Yeah, it's -- it's done. We bought this morning. And, uh -- I mean, this market, obviously nobody was short, you know?[13]

[13] Exh. No. CA-249 at 5-7.

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In a subsequent phone call on 6/22/00 between Joe Knauth and what appears to be the same second trader, the second trader indicates that Reliant was successful in increasing market prices.

Reliant-Knauth:	Knowing what I know -- what has taken place in the last couple of days.
No. 2:	A-huh.
Reliant-Knauth:	I mean, this will prove if we have affected the market or not, basically.
No. 2	Well, I think you have.
Reliant-Knauth:	Yeah.
No. 2	I think indeed you have, and I think it showed up yesterday afternoon.
Reliant-Knauth:	Yeah. I got about $400,000 (grand) in my pocket today.
No. 2	What's that?
Reliant-Knauth:	I got $400,000 (grand) from the expost that says that we did.
No. 2	Exactly. And then ya'll cranked up your units?
Reliant-Knauth:	I don't know.
No. 2	Yeah.
Reliant-Knauth:	As far as you know.
No. 2	Right.[14]

Q. Were there other signs that Reliant was manipulating the market on June 21 and June 22, 2000?

A. Yes. There were other signs. The removal of supply from the PX day-ahead market by Reliant on June 21-22, 2000 also manifested itself as a sharp drop in the ISO final hour-ahead schedules. This is seen in Figure 20 below:

[14] Exh. No. CA-258.

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Figure 20
Reliant Units
Total Final Hour-Ahead Schedules
June (MWh)

Date	Total MWh Scheduled Hour-Ahead
15-Jun-00	44,823
16-Jun-00	43,174
17-Jun-00	42,205
18-Jun-00	34,819
19-Jun-00	46,423
20-Jun-00	46,563
21-Jun-00	12,023
22-Jun-00	11,709
23-Jun-00	38,383
24-Jun-00	38,201
25-Jun-00	36,768
26-Jun-00	40,942

E. Other Potential Manipulation

Q. Were there other instances where Reliant's final hour-ahead schedules display a similar pattern?

A. An examination of final hour-ahead scheduled MWhs by day reveals three more instances of similar drops in MWhs. The magnitude of these drops was not as large as the June 21-22 drop, but nonetheless the decrease in scheduled MWhs is significant. These events occurred in August and September 2000 and are shown in Figure 21 below.

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Figure 21
Reliant Units
Total Final Hour-Ahead Schedules
August and September (MWh)

Date	Total MWh Scheduled Hour-Ahead	Date	Total MWh Scheduled Hour-Ahead	Date	Total MWh Scheduled Hour-Ahead
27-Jul-00	54,547	28-Aug-00	60,355	18-Sep-00	49,792
28-Jul-00	56,799	29-Aug-00	47,981	19-Sep-00	41,769
29-Jul-00	55,446	30-Aug-00	50,275	20-Sep-00	43,202
30-Jul-00	52,817	31-Aug-00	48,060	21-Sep-00	45,617
31-Jul-00	48,396	1-Sep-00	35,952	22-Sep-00	39,945
1-Aug-00	36,926	2-Sep-00	37,264	23-Sep-00	30,372
2-Aug-00	36,075	3-Sep-00	33,487	24-Sep-00	30,799
3-Aug-00	46,894	4-Sep-00	36,450	25-Sep-00	42,239
4-Aug-00	48,189	5-Sep-00	49,810	26-Sep-00	38,644
5-Aug-00	51,798	6-Sep-00	51,769	27-Sep-00	40,483
6-Aug-00	48,562	7-Sep-00	51,272	28-Sep-00	38,279
7-Aug-00	51,968	8-Sep-00	50,947	29-Sep-00	40,270

Q. Is there an explanation for these drops in day-ahead final schedules?

A. An examination of meter data helps to explain the September episodes. Figure 22 shows the days in September during which various Reliant units had no metered output.

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Figure 22
Reliant Units
Days with No Metered Output
September 2000

Unit	Capacity (MW)	Days with No Metered Output
CWATER_7_UNIT 1	63	Sept. 1-2, Sept. 22*
CWATER_7_UNIT 2	81	n.a.
CWATER_7_UNIT 3	241	Sept. 22*
CWATER_7_UNIT 4	241	Sept. 3-4, Sept. 22*
ETIWND_7_UNIT 1	132	Sept. 1-4, Sept. 10-12, Sept. 21-30
ETIWND_7_UNIT 2	132	Sept. 1-4, Sept. 10-12, Sept. 21-30
ETIWND_7_UNIT 3	320	Sept. 1-4, Sept. 10, Sept. 23-24
ETIWND_7_UNIT 4	320	Sept. 1-4, Sept. 10, Sept. 23-24
ETIWND_7_UNIT 5	120	Sept. 1-4, Sept. 20-30**
GOLETA_6_ELLWOD	56	Sept. 1-30
MNDALY_7_UNIT 1	215	n.a.
MNDALY_7_UNIT 2	215	n.a.
MNDALY_7_UNIT 3	120	Sept. 1-4***, Sept. 21-28
ORMOND_7_UNIT 1	724	Sept. 20-30
ORMOND_7_UNIT 2	750	n.a.

MRCHNT_2_PLANT not included.
*During peak hours.
**Except for 3 hrs. on Sept. 1-4 and 1 hr. on Sept. 20-30.
***Except for 1 hr.

Q. Were these units available during the above dates or were they on outages?

A. Every Etiwanda unit, the Ellwood Unit, and Mandalay Unit 3 were available on Sept. 1-4, but did not run. The Coolwater Unit 1 was available on Sept. 1-2, but not run. Coolwater Unit 4 did not run on Sept. 3-4 because it was reported unavailable. Thus 1263 MWs of capacity was not operating on Sept. 1-2. This represented 34% of Reliant's total capacity. On Sept. 3-4, 1441 MWs were not operating or 39% of Reliant's total capacity. These numbers suggest that Reliant repeated its June 21-22 withholding strategy on Sept. 1-4.

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1 Q. What evidence do you have concerning the Sept. 23-24 event?

2 A. During September 23-24, 2000 all of Reliant's Etiwanda units, Ellwood, and
3 Mandalay Unit 3 were available, but did not run. In addition, Ormond Unit 1
4 was reported out. On Sept. 23-24, 1924 MWs of Reliant capacity was not
5 operating or 52% of its total capacity. I would therefore conclude, based on this
6 evidence, that both September events were repeated attempts of the same
7 manipulative strategy deployed on June 21 and June 22 to withhold supply and
8 increase market prices.

9 Q. What evidence do you have on the August 1-2, 2000 event?

10 A. The drop in hour-ahead schedules on Aug. 1-2, 2000 cannot be explained by
11 non-operational units. All of Reliant's units except Coolwater Unit 2 and
12 Etiwanda Unit 1, were running on these two days. In fact, although there was a
13 large decline in the hour-ahead final schedules, MWhs bid into the real time
14 market increased dramatically on Aug 13. *See* Figure 23 below for hourly
15 MWhs bid into the real time market by Reliant. Thus, this event is somewhat
16 different from those in June and September. In this case, Reliant withdrew
17 energy from the day-ahead market, and attempted to dump it into the real time
18 market.

19 Q. Is Reliant's behavior on August 1-2, 2000 evidence of market manipulation?

20 A. This strategy is also manipulative since withdrawing supply in the day-ahead
21 market will cause the ISO to purchase more replacement reserves and will drive
22 up the prices for ancillary services. This can also result in increases in the real
23 time price, if other sellers respond to diminished quantities scheduled day-ahead,
24 and spike their bid prices accordingly in real time. The impact of withdrawing

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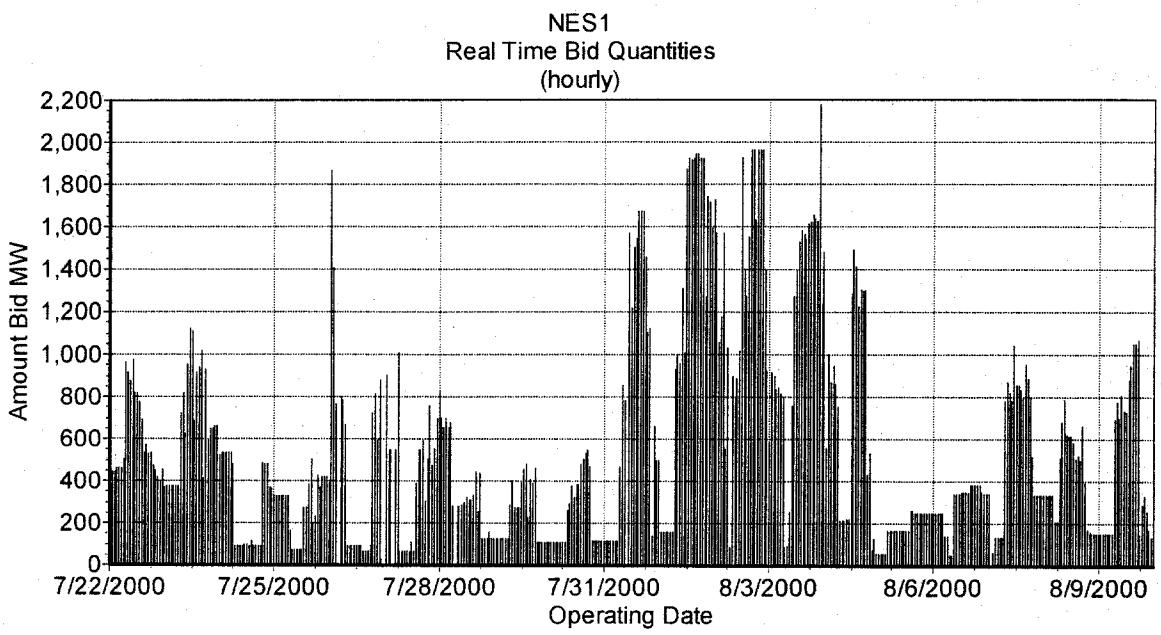
supply from the PX day-ahead market is further explained in the testimony of Dr. Stern. *See* Exh. No. CA-3.[15]

Figure 23



Q. Do you have any other comments about Reliant's bidding behavior?

A. Appendix B contains a series of figures depicting the hourly bid prices in November and December for the five in-state generators, Powerex, LADWP, and Idaho Power. These figures show that Reliant regularly bid prices over $2000 in December after the implementation of the soft cap. Also, Exh. No. CA-55 contains a set of Reliant e-mails stating prices at which Reliant would offer balance of the month energy in December. Prices on these products ranged from $690 to $1343 per MW.

[15] Through discovery, Cal Parties learned that Reliant knew that it could move real time prices or cause congestion as early as May 2000. This is revealed in transcripts of trader telephone conversations. *See* Exh. No. CA-34.

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V. IN-STATE GENERATION OWNERS: MIRANT (SCEM)

A. General Trends

Q. What are Mirant's bidding patterns in the ISO real time market during the summer 2000?

A. Mirant's bidding behavior can generally be characterized as persistently high bidding for some units, and hockey stick bidding for others.

Q. What units were bid at consistently high prices?

A. Throughout the May-September 2000 period, Mirant's Potrero Units 4, 5 and 6 were bid at, or near, the price cap in most hours. The average monthly bid prices for these units are shown in Figure 24. The fact that Mirant was willing to run these units at the September prices is evidence that the bid prices in May-July did not reflect costs.

Figure 24
Mirant Units
Average BEEP Stack Bid Prices*
Potrero Units (in $)

	May-00	Jun-00	Jul-00	Aug-00	Sep-00
POTRPP_7_UNIT 4	670.50	675.21	474.49	247.09	234.56
POTRPP_7_UNIT 5	692.38	696.70	479.41	246.76	245.44
POTRPP_7_UNIT 6	716.59	717.36	489.79	248.60	236.02

*The average for July is taken from July 1 – Aug. 6. The average for August is taken from Aug. 7 – Aug. 31. This is to account for the change in the price cap.

Q. Which Mirant units submitted hockey stick bids into the real time market?

A. Mirant had pronounced hockey stick bidding for a number of units during the May – July, 2000 period. For example, in May, Pittsburg Unit 1 had an average

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bid span of $247 and Pittsburg Unit 5 had an average bid span of $208. The bid spans for Pittsburg Unit 4, Pittsburg Unit 7, Contra Costa Unit 6 and Contra Costa Unit 7 increased in July even though the price cap had been reduced from $750 to $500. Average bid spans for Mirant units are shown in Figure 25.

Figure 25
Mirant Units
Average Bid Span*
(in $)

UNIT_ID	MAY	JUNE	JULY
COCOPP_7_UNIT 6	99	99	104
COCOPP_7_UNIT 7	85	90	104
PITTSP_7_UNIT 1	247	103	100
PITTSP_7_UNIT 2	180	131	89
PITTSP_7_UNIT 3	197	135	90
PITTSP_7_UNIT 4	80	100	124
PITTSP_7_UNIT 5	208	134	129
PITTSP_7_UNIT 6	n.a.	191	141
PITTSP_7_UNIT 7	144	167	190
POTRPP_7_UNIT 3	87	85	86
POTRPP_7_UNIT 4	3	8	4
POTRPP_7_UNIT 5	2	9	11
POTRPP_7_UNIT 6	3	9	11
SBERDO_7_UNIT 1	n.a.	0	32
SBERDO_7_UNIT 2	n.a.	125	35

*July includes the first 6 days of August to account for the change in the price cap.

B. May 2000

Q. What were Mirant's bidding patterns in May, 2000?

A. Overall, Mirant submitted very high bid prices for its units in May. Figure 26 lists average bid prices for Mirant units in the month of May. There is only one unit, Potrero Unit 3, that has average bid prices less than $100.

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Figure 26
Mirant Units
Average BEEP Stack Bid Prices*
May 2000 (in $)

UNIT	May-00 Bid Prices
COCOPP_7_UNIT 6	268.61
COCOPP_7_UNIT 7	202.02
PITTSP_7_UNIT 1	558.02
PITTSP_7_UNIT 2	603.79
PITTSP_7_UNIT 3	610.87
PITTSP_7_UNIT 4	481.67
PITTSP_7_UNIT 5	412.95
PITTSP_7_UNIT 6	n.a.
PITTSP_7_UNIT 7	169.19
POTRPP_7_UNIT 3	96.55
POTRPP_7_UNIT 4	670.50
POTRPP_7_UNIT 5	692.38
POTRPP_7_UNIT 6	716.59
SBERDO_7_UNIT 1	n.a.
SBERDO_7_UNIT 2	n.a.

Q. Did Mirant spike bids during any days in May 2000?

A. In addition to overall high prices in May there are pronounced bid price spikes on numerous days; May 2, May 3, May 4, May 5, May 15, May 16, May 19, May 20, May 21, May 22 (ISO declared emergency), May 23, May 28, and May 31, 2000. During these episodes, Mirant increased the bid prices on all or a large number of units that were bid into the real time market. Figure 27 displays the average bid price in each hour taken over all of Mirant's units in May.

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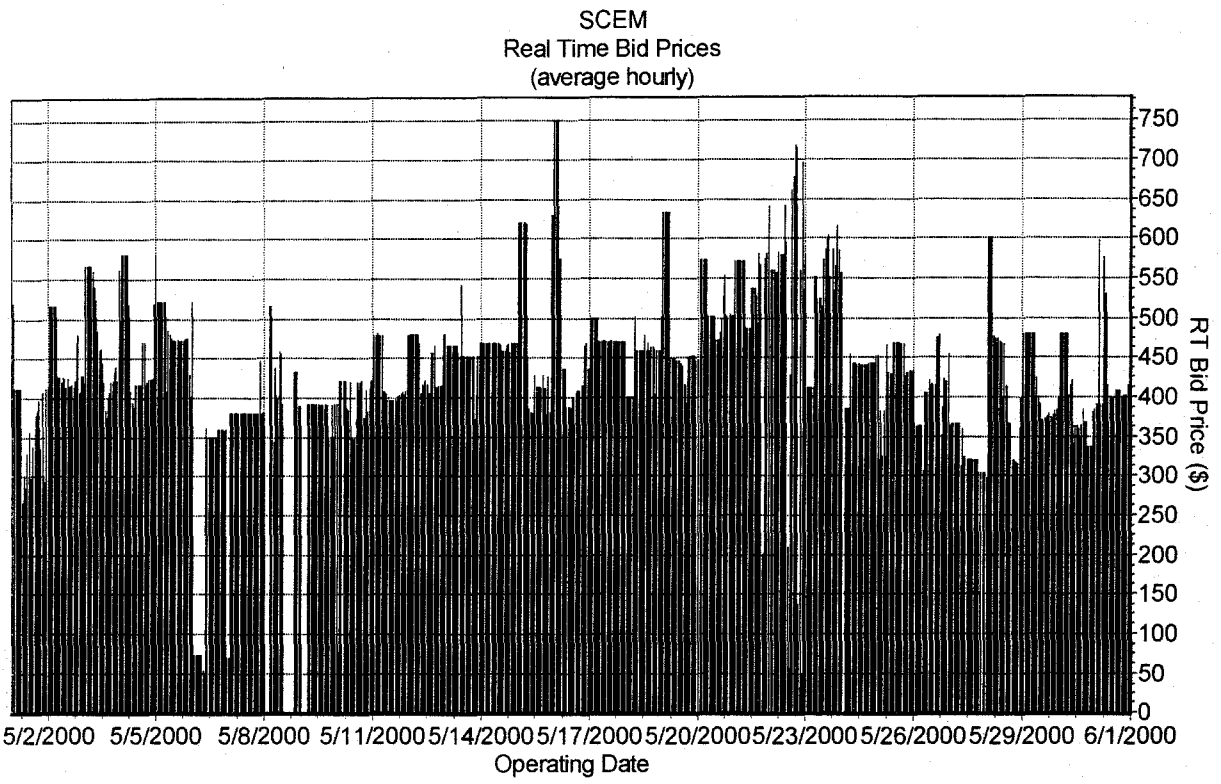
Figure 27



Q. Were there other non-competitive bidding strategies employed by Mirant in May 2000?

A. Yes, Mirant used a bidding strategy that consisted of withholding bids from a unit for a period of time, followed by a bid price spike. In the case of Contra Costa Unit 6 shown below, the unit was not bid for two days when it was available prior to May 22 (the unit was reported out between May 13-20), and then it was bid in at about $650 on May 22 in the hours prior to the commencement of the May 22 emergency. During the actual emergency hours, Mirant had only two bids in the market, one in hour 12 for 5 MWhs and one in hour 13 for 5 MWhs. On May 23, Mirant resumed offering supply into the real time market. Figure 28 illustrates this bidding behavior.

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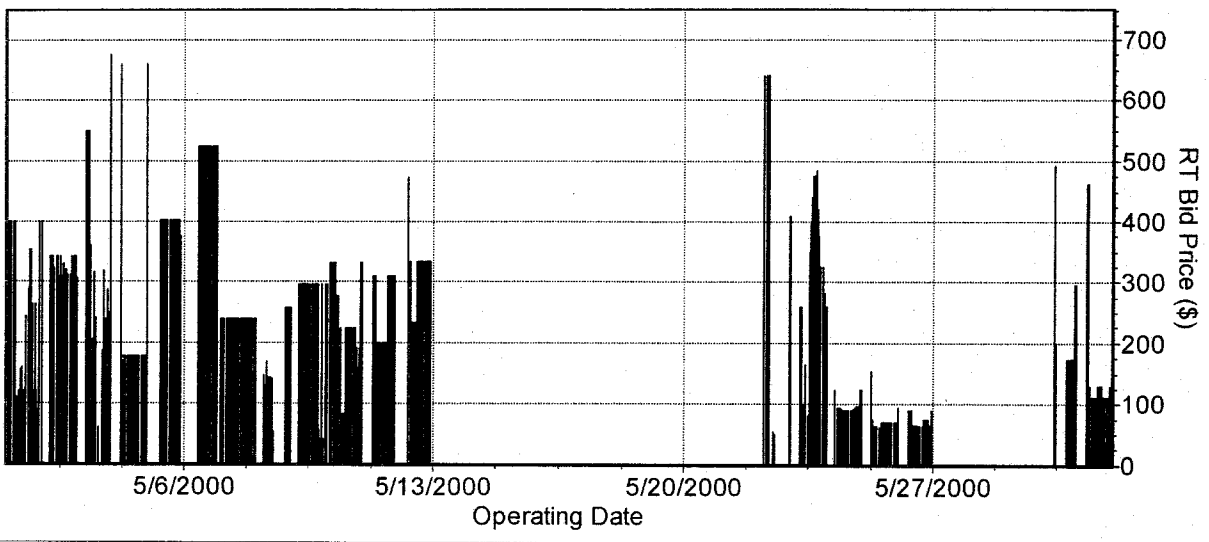
Figure 28

COCOPP_7_UNIT 6
Real Time Bid Prices
(average hourly)



Q. Were there other "no bid/spike" bidding patterns by Mirant in May 2000?

A. There were several "no bid/spike" patterns for Contra Costa Unit 7. In this case, the most salient episode did not occur during the May emergency, but rather earlier, on May 15. On the two days prior to May 15, 2000 Mirant submitted just two bids submitted into the real time market in hours 20 and 21 on May 13, even though there was abundant capacity available during all hours on those days. The bid price spike on May 15 reached an average of $700. Figure 29 illustrates the "no bid/spike" pattern.

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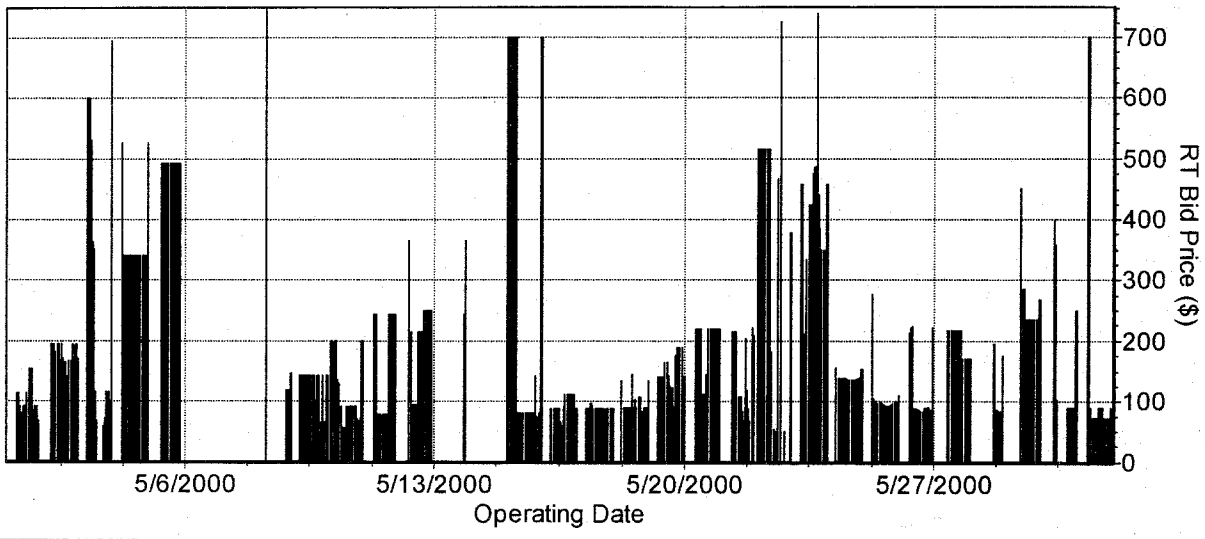
Figure 29

COCOPP_7_UNIT 7
Real Time Bid Prices
(average hourly)



Q. How prevalent were these "no bid/spike" bidding patterns among the other Mirant units in May 2000?

A. Pittsburg Unit 1, Pittsburg Unit 2, and Pittsburg Unit 3 all displayed a pattern of no bids in the days preceding the May 22, 2000 ISO emergency followed by a price spike close to the $750 price cap the day of, and the day following, May 22. A fourth unit, Potrero Unit 3, displayed the same "no bid" pattern, but there is no price spike following the "no bid" period.

Pittsburg Unit 2, Pittsburg Unit 5, and Potrero Unit 6 display a pattern of no bids in the days prior to May 15 followed by price spikes on May 15.

Significantly, these units generally had capacity available all month, (Pittsburg Unit 1 was not available from May 1-12 and Potrero Unit 6 was not available from May 1-3, but this doesn't affect the patterns discussed here) with the exception of Potrero Unit 3 which was not available from May 17-21, and thus

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these units could have been bid into the real time market during most days. For example, Pittsburg Unit 2 had a final hour-ahead schedule that was less than the unit's available capacity in 99.6% of the hours. Moreover, in over 90% of the hours, the unit's actual metered output was less than it was capable of producing.

Q. What do you conclude about such behavior?

A. *I conclude that these bidding patterns are not consistent with competitive behavior. They are consistent with a strategy to withhold supply and to increase market prices.* More examples of this bidding behavior are illustrated in Figures 30 and 31.

Figure 30

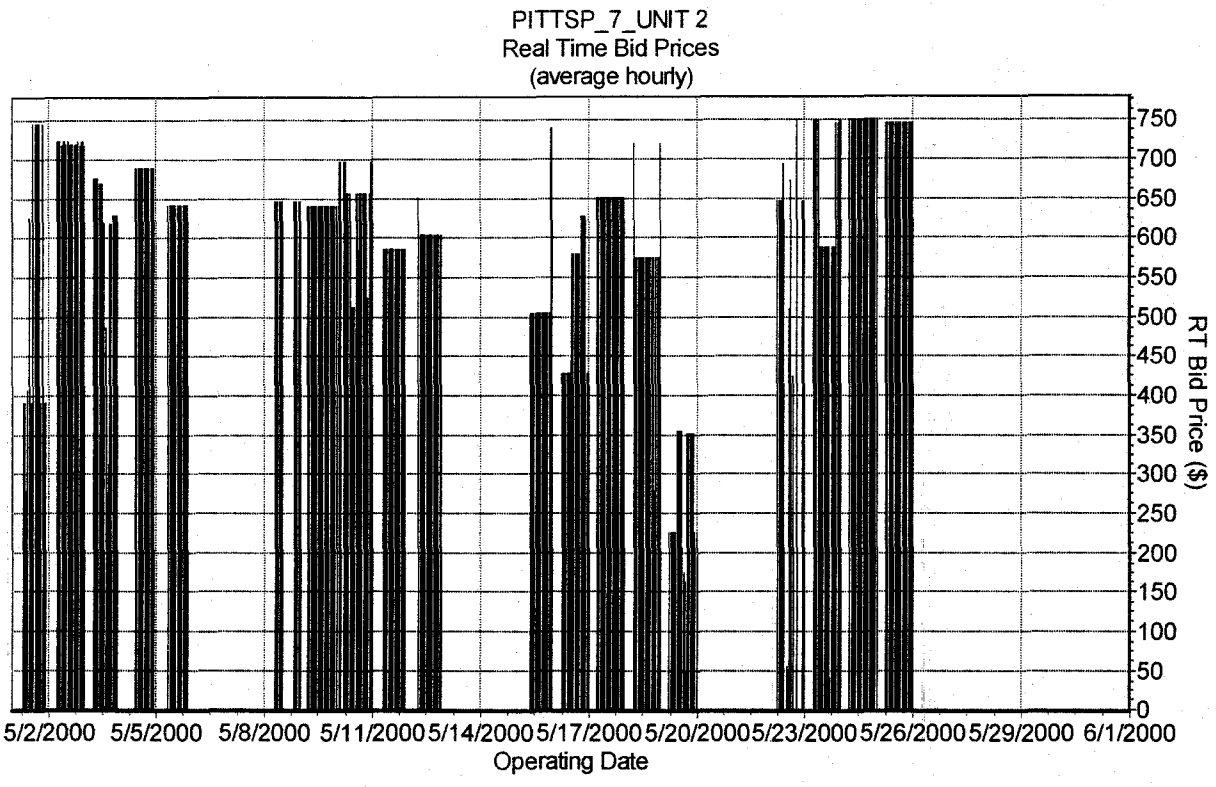

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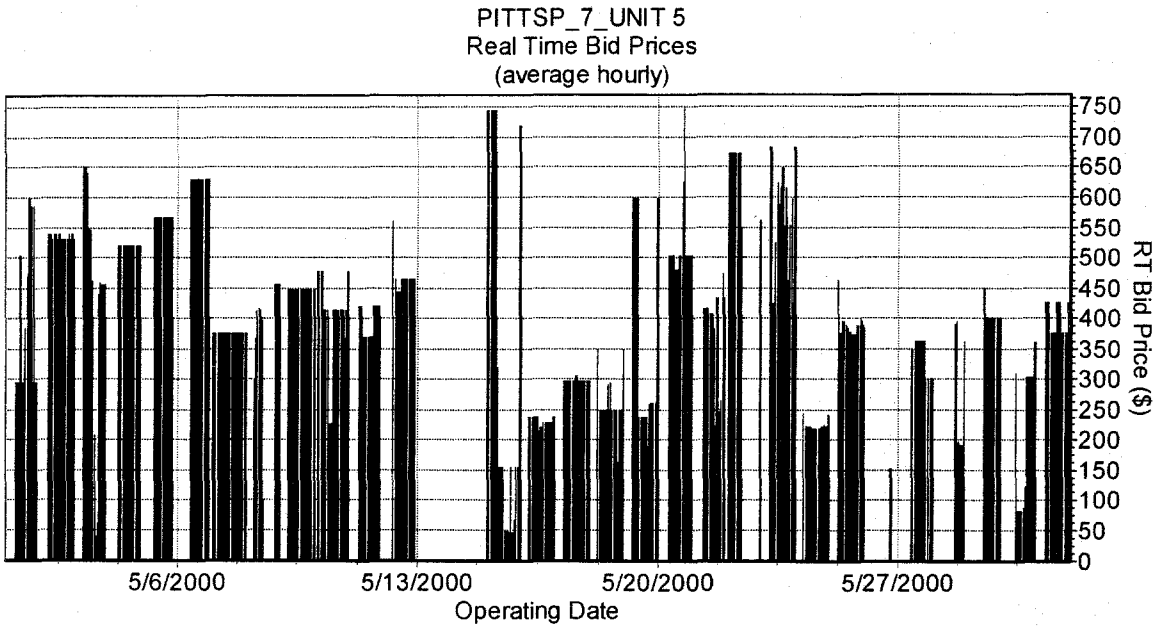
Figure 31



C. June 2000

Q. Please describe Mirant's bidding patterns in June 2000?

A. In June, the same bidding patterns continued. There were pronounced bid price spikes on June 2, June 5, June 8, June 12-13 (this spike was preceded by a "no bid" period—where none of Mirant's units were bid into the real time market, and then on June 13 there was an ISO declared emergency), June 16 (this spike is also preceded by an all unit "no bid" period on June 15), June 21, June 24, June 25, June 26, June 27 (ISO declared emergency), and June 28 (ISO declared emergency). During these episodes, Mirant increased the bid prices on all or a large number of the units that were bid into the real time market. In addition, on June 3, June 12, June 15, and June 20 there were periods during which no bids were submitted for any unit.

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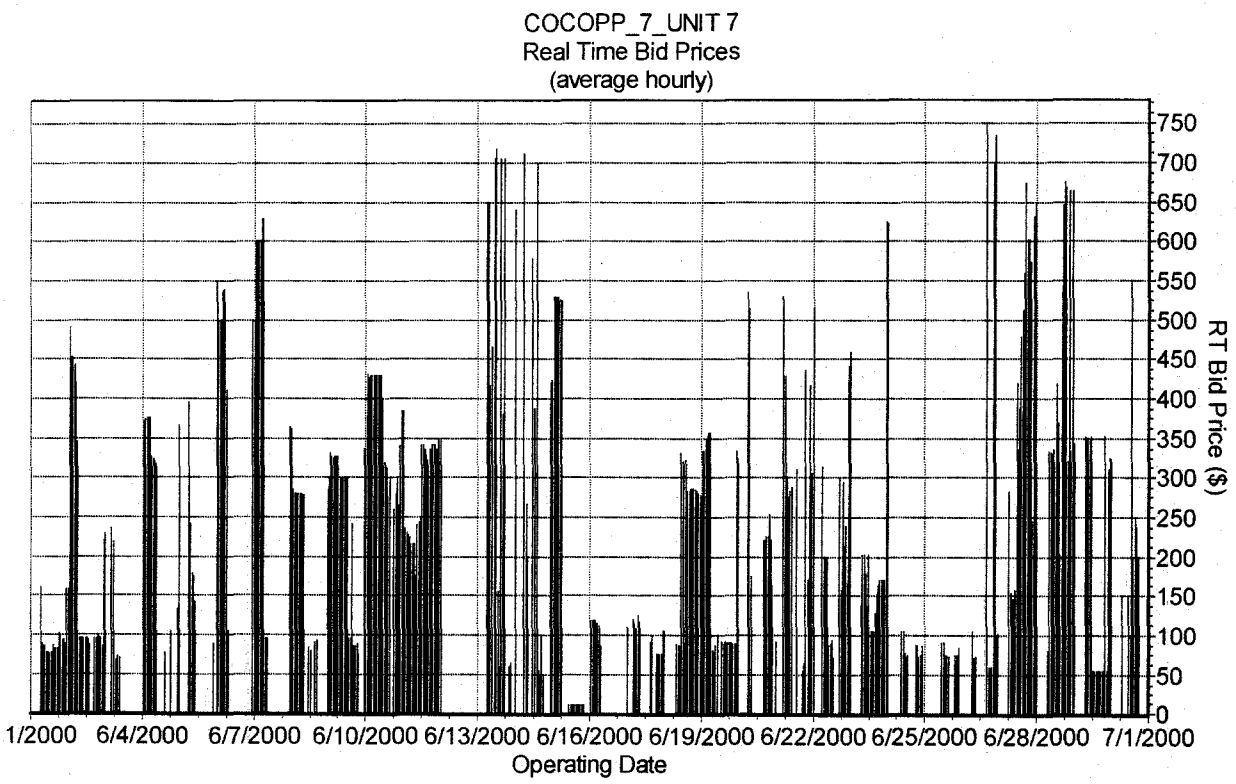
Q. Do you have an example that illustrates the "high bid" or "no bid" strategy?

A. Figure 32 shows hourly bid prices for Mirant's Contra Costa Unit 7. The absence of bids on June 12, 2000 with the subsequent price spike during the ISO declared emergency on June 13, 2000 is clearly visible. The following price spike can be seen clearly in the graph of Contra Costa Unit 2. Many of the price spikes that exist in the overall data can also be seen in this figure. *These bidding patterns are not consistent with competitive behavior. They are consistent with a strategy to withhold supply and to increase market prices.*

Figure 32



Q. Did you examine Mirant's final hour-ahead schedules in June 2000?

A. Yes. On June 17 and June 18, there is a drop in the total MWs in Mirant's hour ahead final schedules. This is a similar pattern to what occurred in Reliant's

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schedules on June 21 and June 22, the days that Reliant was found to have been manipulating the market. This pattern can be seen in Figure 33.

Figure 33
Total Final Hour-Ahead Energy
Scheduled by Day (MWh)

Date	Reliant	Mirant
12-Jun-00	42,459	24,718
13-Jun-00	40,826	23,926
14-Jun-00	44,960	30,397
15-Jun-00	44,823	33,173
16-Jun-00	43,174	30,801
17-Jun-00	42,205	14,956
18-Jun-00	34,819	10,790
19-Jun-00	46,423	26,830
20-Jun-00	46,563	29,572
21-Jun-00	12,023	29,543
22-Jun-00	11,709	29,709
23-Jun-00	38,383	28,086
24-Jun-00	38,201	21,246
25-Jun-00	36,768	20,240

Q. Have you examined other data for June 17 and June 18, 2000?

A. I have examined the meter data on these two days for Mirant units. On these days, Potrero Unit 3 (a 206 MW unit) was reported out, and Pittsburg Unit 7 (a 682 MW unit) reported a partial outage. However, there were five Mirant units that uncharacteristically produced substantially less energy on those days: Contra Costa Unit 6, Contra Costa Unit 7, Pittsburg Unit 1, Pittsburg Unit 2, and Pittsburg Unit 3. Based on this evidence, I would conclude that Mirant was likely manipulating the market on June 17 and June 18 in manner similar to Reliant on June 21 and June 22.

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D. July 2000

Q. What were Mirant's bidding patterns in July 2000?

A. In July, Mirant continued the same "no bid/spike bid price" practices, albeit to a lesser extent. Price spikes occurred in the aggregate data on July 3, July 14, July 26, July 27, July 28 (ISO declared emergency), and July 29. During these episodes, Mirant increased the bid prices on all or a large number of the units that were bid into the real time market. Also, in July, no bids were submitted by Mirant for any unit for a period of hours on July 8 and July 16.

Q. Do you have an illustration of these bidding patterns?

A. Figures 34 and 35 which illustrate the hourly bid prices for Pittsburg Unit 3 and Pittsburg Unit 4 show striking "no bid/spike" patterns.

Figure 34

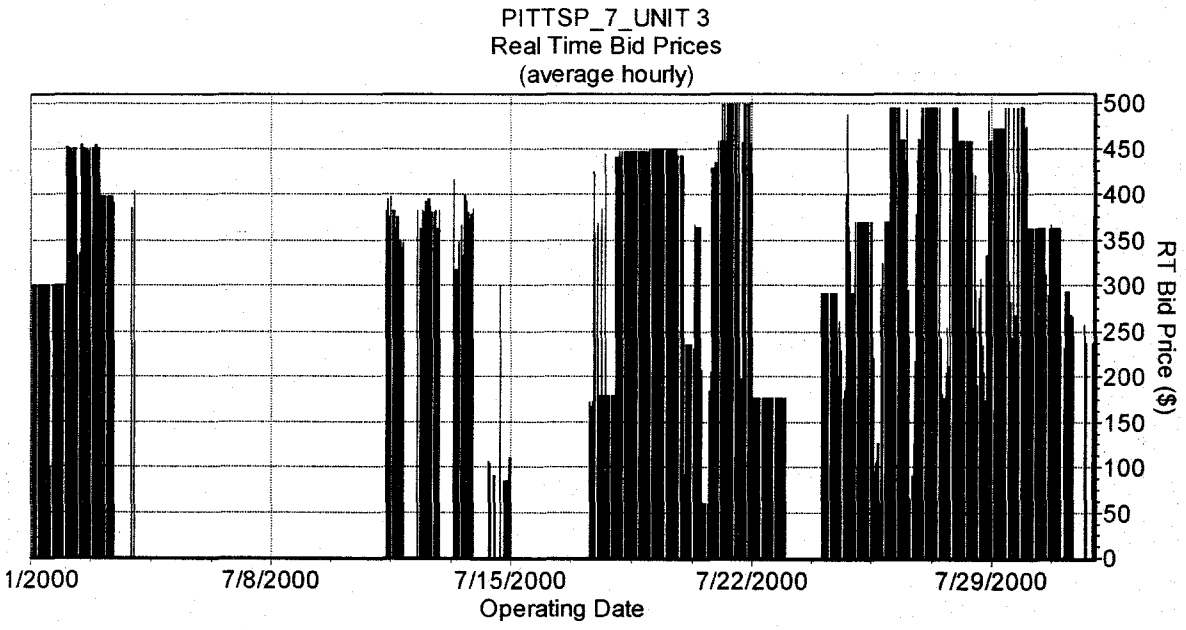

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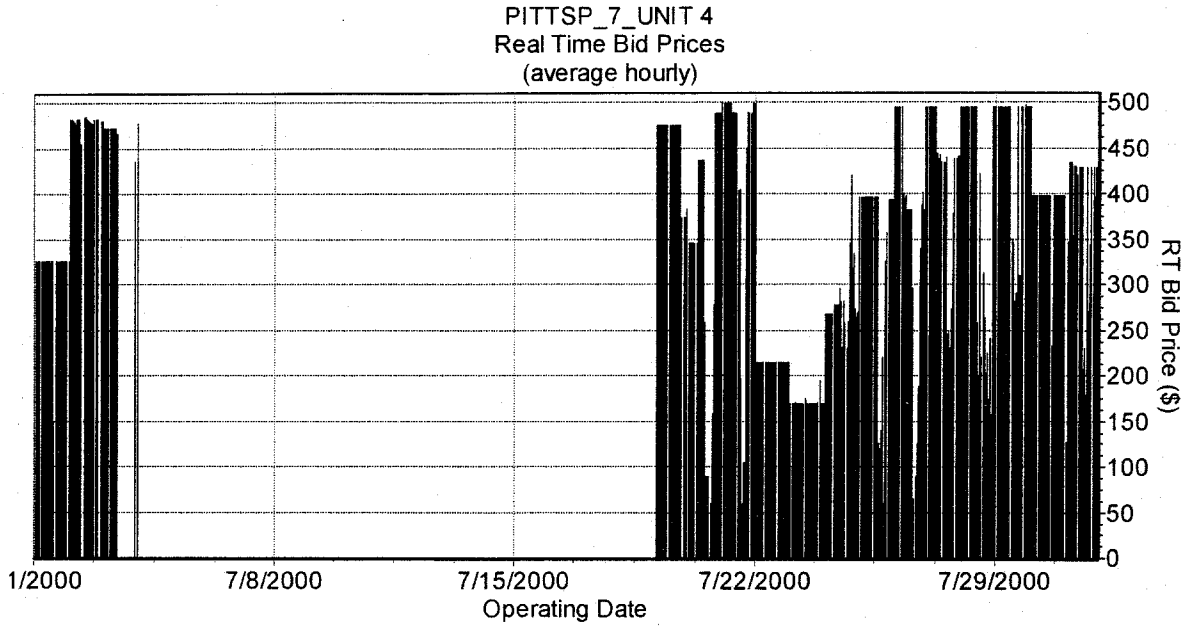
Figure 35



Q. Did you find any other anti-competitive bidding behavior by Mirant in July?

A. Yes, it is worth noting that the amount of MWs that Mirant bid into the real time market during the second half of the month was twice the amount bid in during the first half of the month. Figure 36 below illustrates Mirant's real time bid quantities in July.

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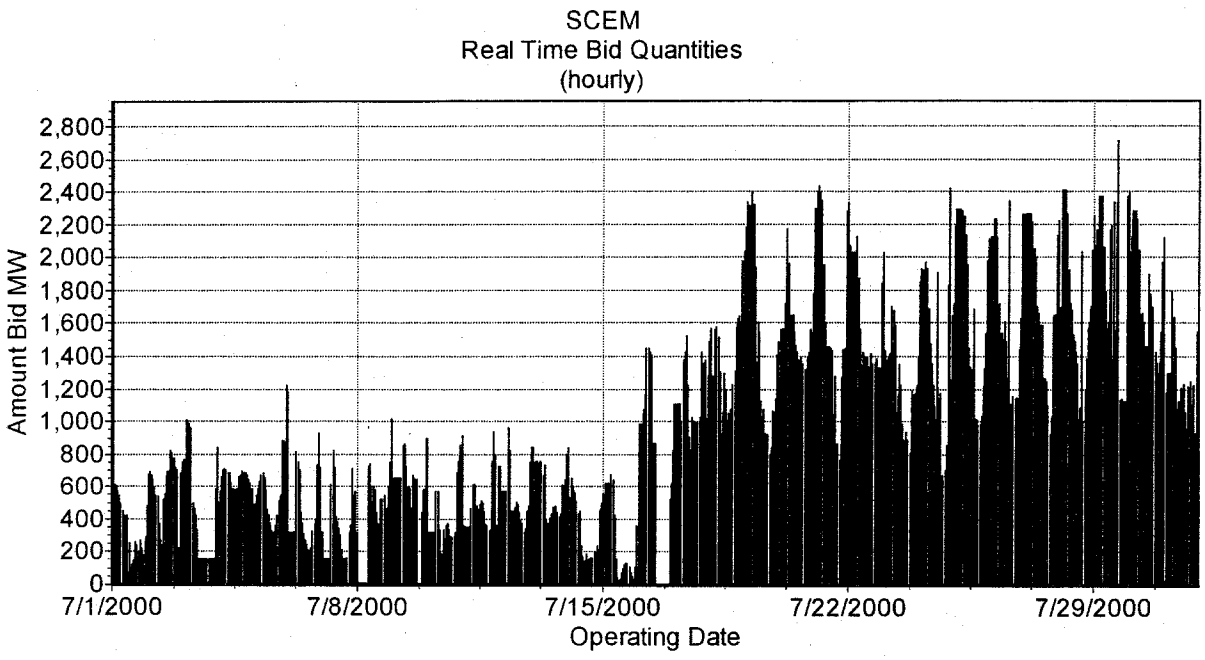
Figure 36



Q. Is there an explanation for the reduced amount of MWs bid into the real time market in the first two weeks of July?

A. The low quantities of MWs bid into the real time market from July 1-16 can be explained by two facts. First, Mirant did not run most of its units during certain days in the first two weeks of July. Second, those units that were producing energy were not operated at full capacity In fact, some units were producing a level of output far below their capability. Figure 37 contains a listing of days during which units had no metered output.

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Figure 37
Mirant Units
Days with No Metered Output
July 1 through July 16

Unit	Capacity (MW)	Days with No Metered Output
COCOPP_7_UNIT 6	335	n.a.
COCOPP_7_UNIT 7	337	July 4-9
PITTSP_7_UNIT 1	150	July 8-9
PITTSP_7_UNIT 2	150	July 6-9
PITTSP_7_UNIT 3	150	July 3-10
PITTSP_7_UNIT 4	145	July 4-16
PITTSP_7_UNIT 5	312	July 8-9
PITTSP_7_UNIT 6	317	July 6-10
PITTSP_7_UNIT 7	682	July 1-4, 14-15
POTRPP_7_UNIT 3	206	n.a.
POTRPP_7_UNIT 4	52	July 1-16*
POTRPP_7_UNIT 5	52	July 1-16**
POTRPP_7_UNIT 6	52	July 1-16***

San Bernadino units not included.
*Except for 5 hrs. on July 14
**Except for 9 hrs. on July 5 and 4 hrs. on July 14.
***Except for 3 hrs. on July 14.

Q. What does Figure 32 show?

A. On July 8-9, Mirant had 1717 MW of capacity that was not operating, or 58% of Mirant's total capacity. On July 6-7, Mirant had 1255 MW of capacity that was not operating, or 48% of Mirant's total capacity. Most of this capacity was available, but simply not run (nor bid into the real time market as shown in Figure 32). This high level of non-participation appears to be inexplicable and consistent with the exercise of market power.

E. September 2000

Q. What were Mirant's bidding patterns in September 2000?

A. In September, the quantity of MWs that Mirant bid into the real time market fell off sharply. In fact, in August, Mirant bid 1,023,596 MWs into the real time

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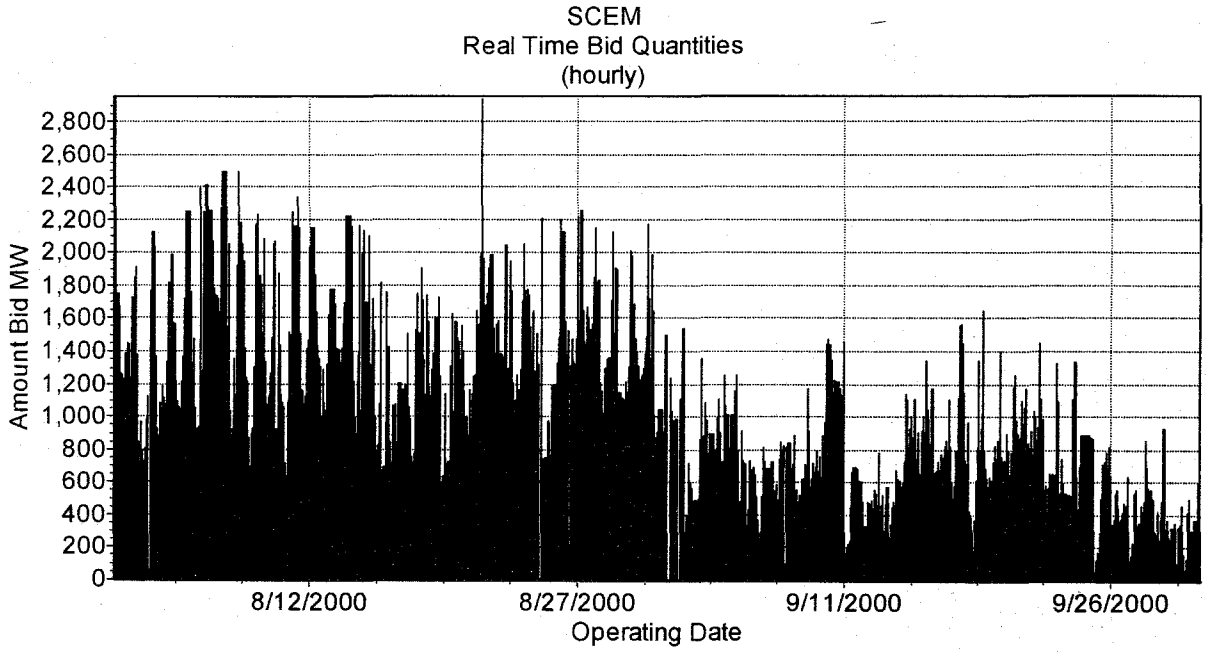
market and that number dropped by over half to 461,239 MWs in September. This decline can be seen in Figure 38 which shows the hourly MWs that Mirant bid into the real time market in August and September. Although there was a decrease in the MWhs bid into the real time market in September, there was an increase in the amount of MWhs in the final hour-ahead schedules. Thus in September 2000, rather than producing less, Mirant simply shifted energy out of the real time market.[16]

Figure 38



Q. Have you found any additional instances of anti-competitive bidding by Mirant?

A. Although I haven't analyzed in detail Mirant's bidding behavior in 2001, there are two e-mails obtained by Cal Parties through the discovery process that relate to anti-competitive bidding during 2001. The first is dated January 10, 2001.

[16] I have not examined where or how this energy was in fact scheduled.

> No more sales to the ISO. David has decided that we don't want the exposure. If they call looking to buy or someone calls looking to sell, we are not in the market. That is all we should be saying to them. We do not want other counterparties to know that we are purposefully holding back from the market!!!!! I have been telling marketers that we are flat. Nobody needs to know anything else.[17]

The second e-mail is dated April 6, 2001.

> Last night the inc and dec prices in NP were $0 for about 4 hours. The reason was no supp bids were put in by any company, so the default price was $0. … We need to always bid in excess MW's as supp bids that we cannot sell bilaterally, and at $150 or more to keep the beep price at $150.[18]

Q. What is the significance of these Mirant e-mails?

A. The first e-mail documents purposeful withholding of generation from the market. The second e-mail is an example of bids that have no relation to the cost of production. The only purpose of the supplemental bids in the above example is to keep the imbalance energy price at the cap.[19]

VI. IN-STATE GENERATION OWNERS: DYNEGY (ECH1)

A. General Trends

Q. What were Dynegy's bidding patterns in the real time market during the summer 2000?

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[17] Exh. No. CA-143.
[18] Exh. No. CA-142.
[19] See Appendix B for Mirant's bid prices in November and December 2000.

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A. Dynegy generally bid its combustion turbines into the real time market at very high prices, especially during June and July 2000.[20] Hockey stick bidding was very pronounced for many Dynegy units in May, June, and July. For example, in May, El Segundo Unit 1 had an average bid span (price difference between the lowest priced bid segment and highest priced bid segment) of $345 and Encina Unit 2 had an average bid span of $299. In June, Encina Unit 1 had an average bid span of $355 and El Segundo Unit 1 had an average bid span of $317. In July the price cap was lowered to $500, but numerous units still averaged bid spans greater than $100. Figure 39 shows average bids spans in May, June, and July for Dynegy units.

Figure 39
Dynegy Units
Average Bid Span ($)

UNIT_ID	MAY	JUNE	JULY
CRNRDO_7_NIGT1	73	11	0
CRNRDO_7_NIGT2	137	48	2
DIVSON_7_DIGT1	86	88	0
DIVSON_7_NSGT1	132	76	13
ELCAJN_7_GT1	186	134	3
ELSEGN_7_UNIT 1	345	317	126
ELSEGN_7_UNIT 2	227	242	134
ELSEGN_7_UNIT 3	141	174	170
ELSEGN_7_UNIT 4	152	149	135
ENCINA_7_EA1	114	355	144
ENCINA_7_EA2	299	267	130
ENCINA_7_EA3	191	194	106
ENCINA_7_EA4	195	176	99
ENCINA_7_EA5	85	257	109
ENCINA_7_GT1	76	49	7
KEARNY_7_KY1	204	146	11
KEARNY_7_KY2	192	242	10
KEARNY_7_KY3	167	124	14
LBEACH_2_230TOT	n.a.	0	0
LBEACH_6_66TOT	0	0	0
MRGT_7_UNITS	225	227	10
OLDTWN_7_NTCGT1	164	77	6

[20] *See* Exh. No. CA-102 for an example of traders discussing prices that include margins of hundreds of dollars in March 2001.

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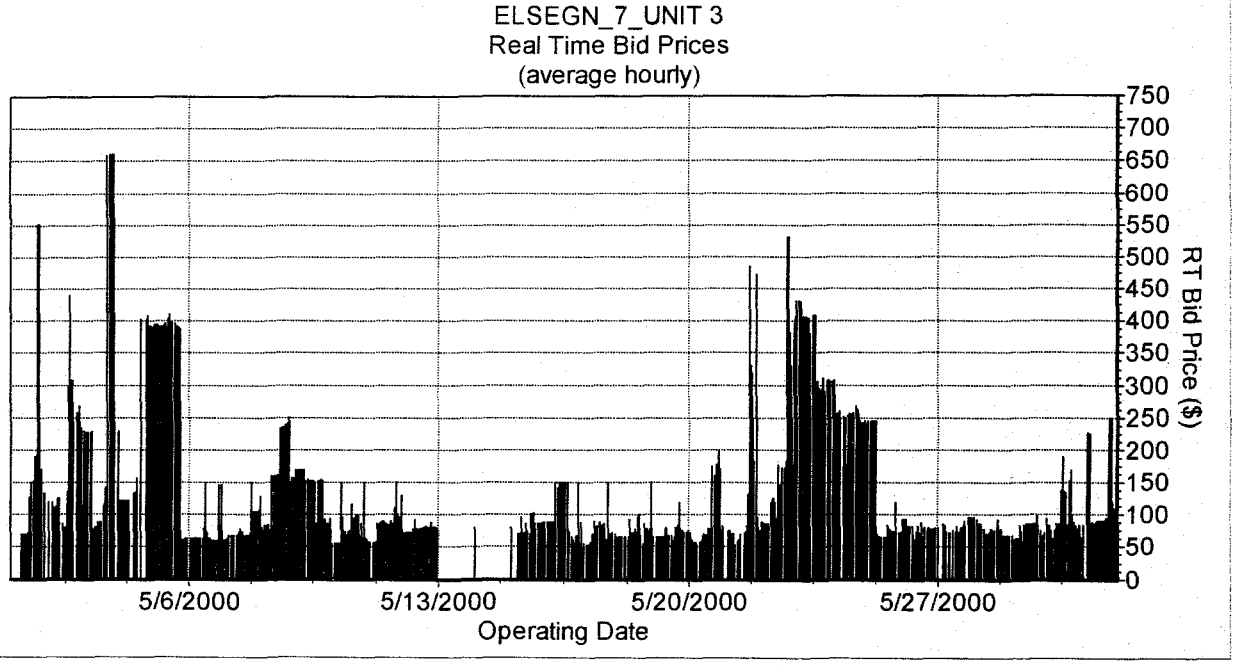
B. May 2000

Q. What are Dynegy's bidding patterns like in May 2000?

A. In May 2000 there were three episodes of spikes in bid prices or elevated bidding: May 4-5, May 21-27, and May 30-31. In these episodes, Dynegy increased the bid prices on all or a large number of its units that were bid into the real time market. Figure 40 shows the hourly bids of El Segundo Unit 3. The graph illustrates Dynegy's elevated bids during the May 4-5 and May 21-27 periods.

Figure 40



Q. Do you have an example of elevated bids during the third period, May 30-31?

A. Kearny Unit 1 provides a vivid example of bid price spikes at the end of the month.

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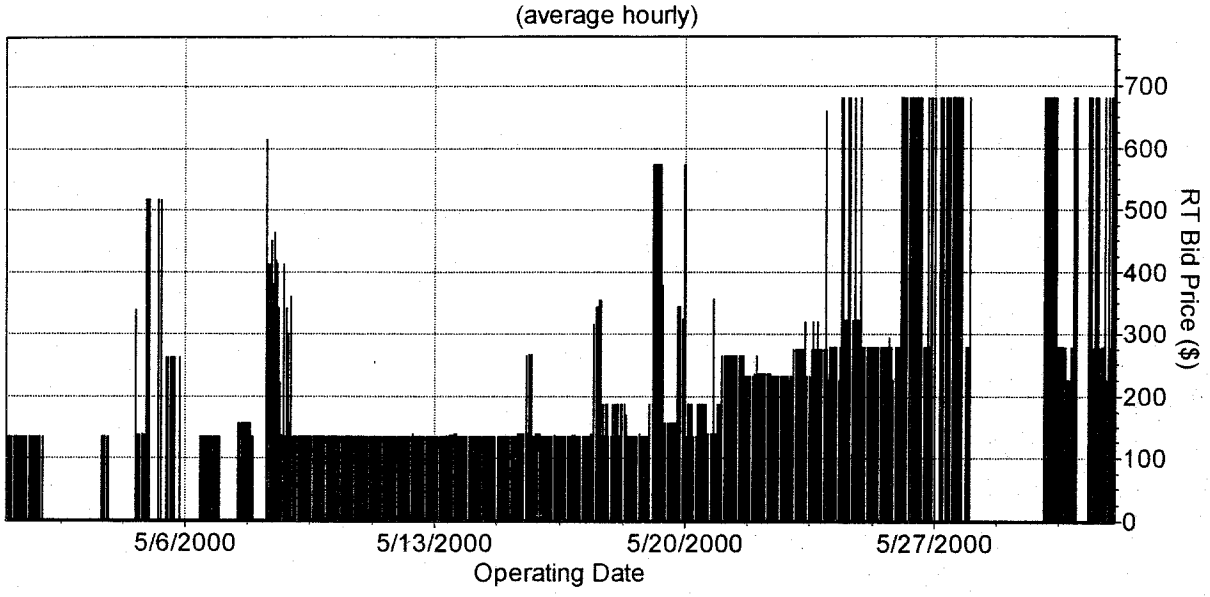
Figure 41



C. June 2000

Q. What were Dynegy's bidding patterns in June 2000?

A. In June, Dynegy submitted very high bid prices for all its units overall. Only 3 of its 22 units bid into the real time market had an average bid price below $200. Dynegy's average bid prices for the month of June by unit are shown in Figure 42.

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Figure 42
Dynegy Units
Average Bid Prices ($)

UNIT	Jun-00 Bid Prices
CRNRDO_7_NIGT1	679.24
CRNRDO_7_NIGT2	677.96
DIVSON_7_DIGT1	706.94
DIVSON_7_NSGT1	308.25
ELCAJN_7_GT1	656.37
ELSEGN_7_UNIT 1	488.51
ELSEGN_7_UNIT 2	404.02
ELSEGN_7_UNIT 3	183.02
ELSEGN_7_UNIT 4	189.98
ENCINA_7_EA1	463.45
ENCINA_7_EA2	394.95
ENCINA_7_EA3	246.14
ENCINA_7_EA4	198.49
ENCINA_7_EA5	277.53
ENCINA_7_GT1	669.14
KEARNY_7_KY1	599.76
KEARNY_7_KY2	467.19
KEARNY_7_KY3	626.09
LBEACH_2_230TOT	482.09
LBEACH_6_66TOT	699.15
MRGT_7_UNITS	394.25
OLDTWN_7_NTCGT1	698.27

Q. Did Dynegy submit bid price spikes into the real time market in June 2000?

A. Yes. There were bid price spikes on June 13 (ISO declared emergency), June 14 (ISO declared emergency), June 15, June 19, June 20, June 21, June 22, June 23, June 24, June 26 (ISO declared emergency), June 27 (ISO declared emergency), June 28 (ISO declared emergency), June 29 (ISO declared emergency), and June 30, 2000. In these episodes, Dynegy increased the bid prices on <u>all or a large number</u> of the units that were bid into the real time market.

Q. Were there other non-competitive bidding strategies employed by Dynegy in June 2000?

A. Yes. In June, in addition to the high overall bid prices, the bidding of Dynegy's Encina units (Units 1-5) and El Segundo units (Units 1-4) followed a peculiar pattern. As with Mirant, during certain periods, (a) no bids were submitted; (b) spiked bids were submitted; or (c) no bids were submitted during a period that was followed by a pattern of spiked bids. This "no bid/spike" behavior occurred around the two emergency periods of June 13-14 and June 26-29, and on June 22-23, the day of, and the day following, the Reliant June 21-22, 2000 market manipulation. Examples of this bidding behavior are shown below in Figures 43, 44, 45, and 46.

Q. What conclusions do you draw from Dynegy's June, 2000 bidding patterns?

A. *These bidding patterns are not consistent with competitive behavior. They are consistent with a strategy to withhold supply and to increase market prices.*

Q. What is your first example of the "no bid/spike" bidding pattern employed by Dynegy during June, 2000?

A. Encina Unit 1 was not bid into the real time market for many days, and then was bid in at prices near or at the $750 cap during the ISO declared emergencies on June 13, 14, 27, 28, and 29. (Encina Unit 2 and El Segundo Unit 1 were bid in with a very similar pattern). The hourly average bid prices for Encina Unit 1 during these days are shown in Figure 43.

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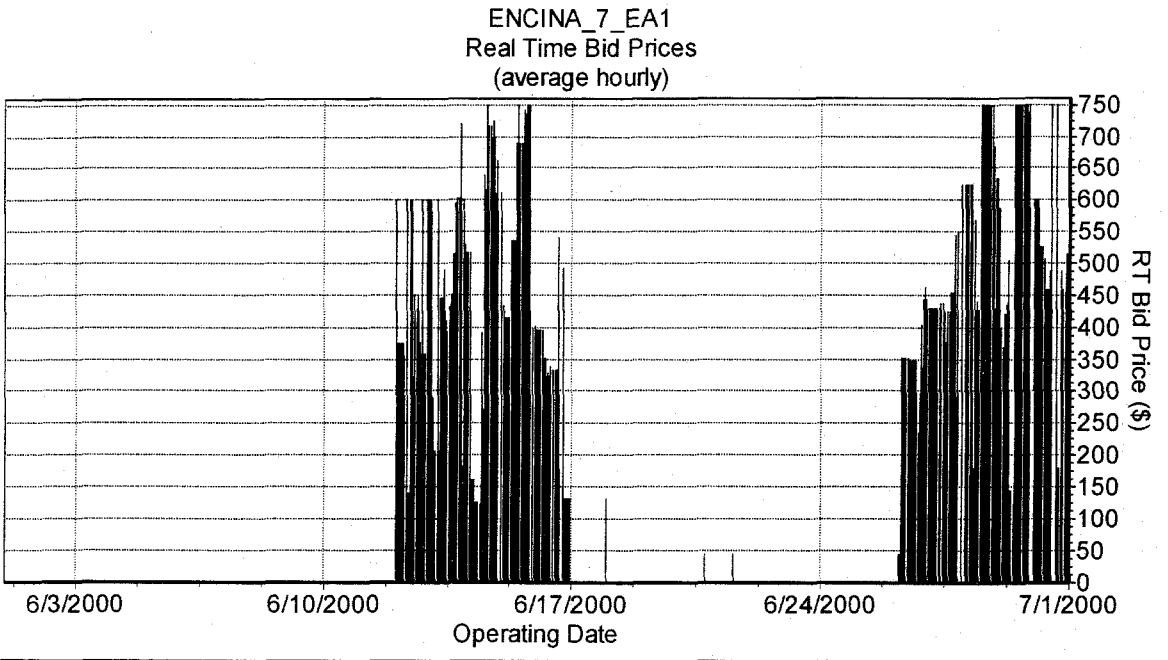
Figure 43



Q. Do you have another example of the "no bid/spike" bidding pattern employed by Dynegy in June, 2000?

A. Yes. Encina Unit 3 was bid in for a number of days at the beginning of the month at prices close to $100 MWh. Starting on June 11, there is a period of no bidding, followed by bid price spikes. The "no bid/spike" pattern is repeated two more times during the month. (Encina Unit 4, Encina Unit 5, El Segundo Unit 2, and El Segundo Unit 4 are bid into the real time market with a similar pattern. Spikes occur during the same three periods, but there are variations on the "no bid" part of the strategy. Sometimes these units are bid in at low prices as opposed to not at all.)

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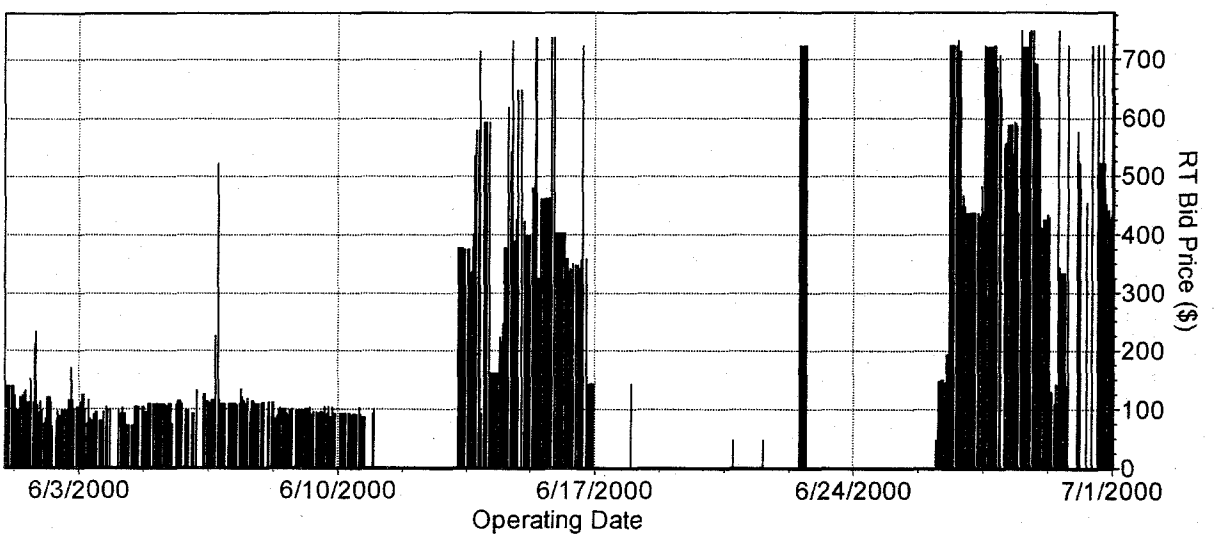
Figure 44

ENCINA_7_EA3
Real Time Bid Prices
(average hourly)



Q. Are there any more examples of the "no bid/spike" bidding pattern as it relates to Dynegy for the June, 2000 period?

A. Yes. There is a slight variation in the timing of the bid prices spikes for Dynegy El Segundo Unit 3, but the bidding pattern is qualitatively similar to the other El Segundo and Encina units. This is shown in Figure 45.

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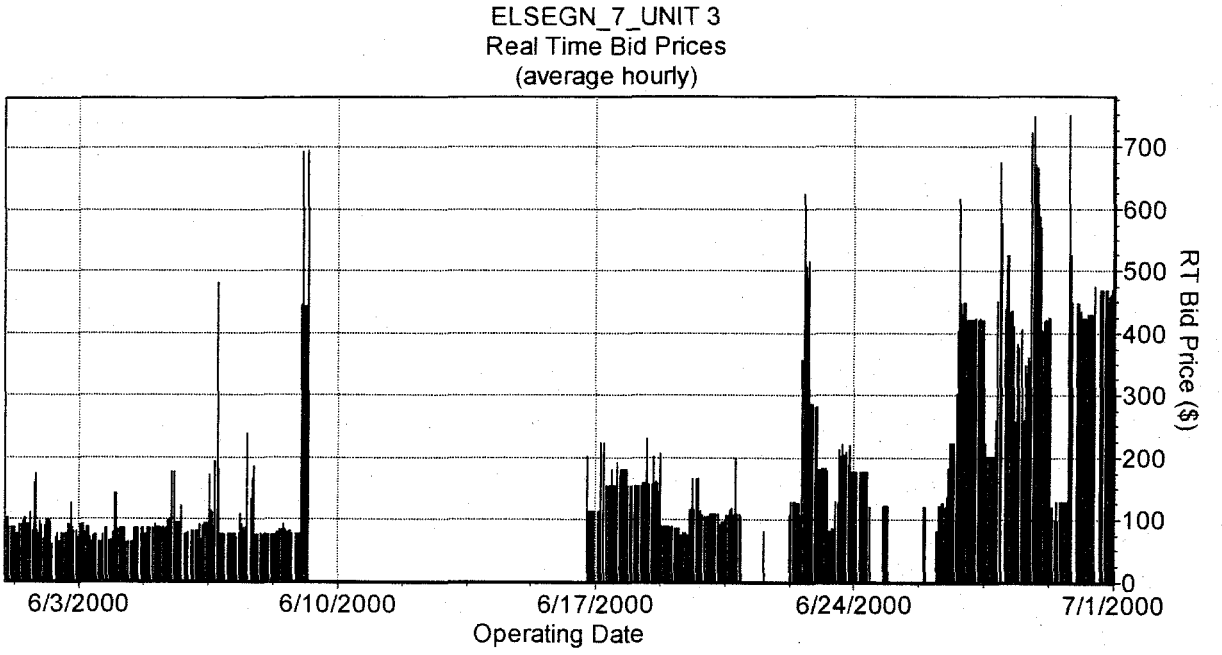
Figure 45



Q. How were Dynegy's other units bid into the real time market in June, 2000?

A. Dynegy's gas turbines were also bid into the real time market with a "no bid/spike" pattern. The spikes occur around the same periods: the two emergency periods of June 13-14 and June 26-29 and the Reliant market manipulation period of June 21-22. An example of this bidding pattern is shown for Coronado Unit 1 in Figure 46 below.

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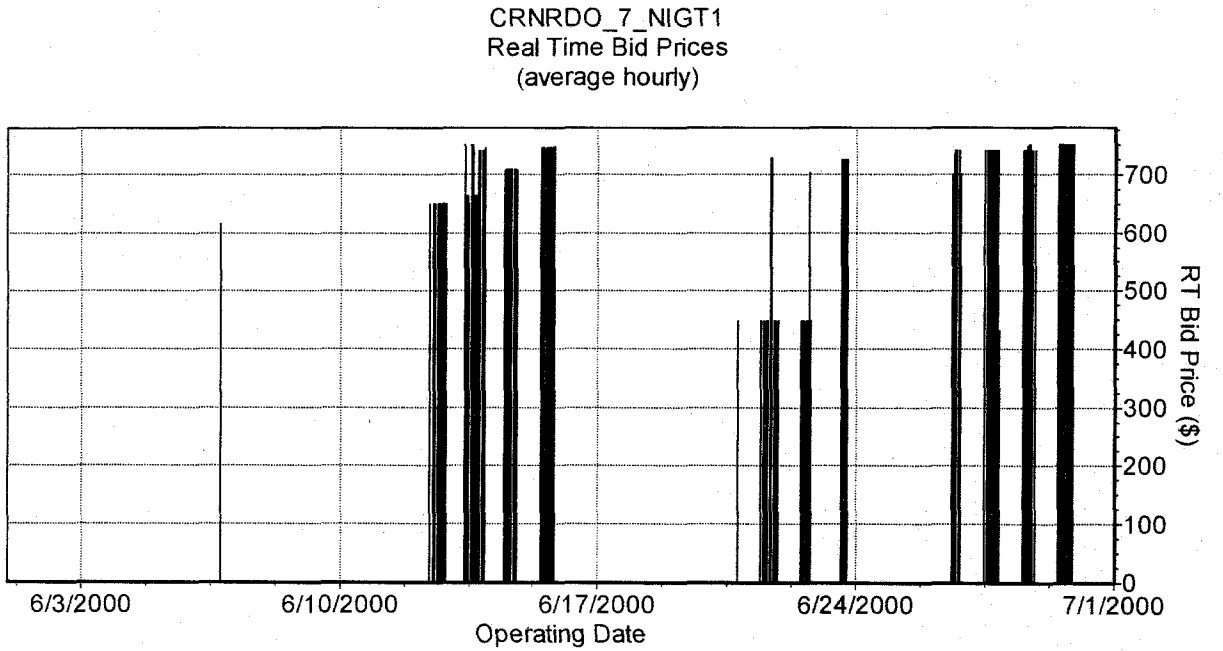
Figure 46



D. July 2000

Q. What were Dynegy's bidding patterns in July 2000?

A. Throughout July, there were numerous bid price spikes. The larger and more pronounced spikes occurred on July 2, July 12, July 13, July 14, July 17, July 18, July 19 (ISO declared emergency), July 20 (ISO declared emergency), July 21, July 25 (ISO declared emergency), July 26, July 27, July 28 (ISO declared emergency) and July 31 (ISO declared emergency). During these episodes, Dynegy increased the bid prices on <u>all or a large number</u> of the units that were bid into the real time market. Figure 47 shows the frequency and magnitude of the Dynegy (ECH1) bid price spikes.

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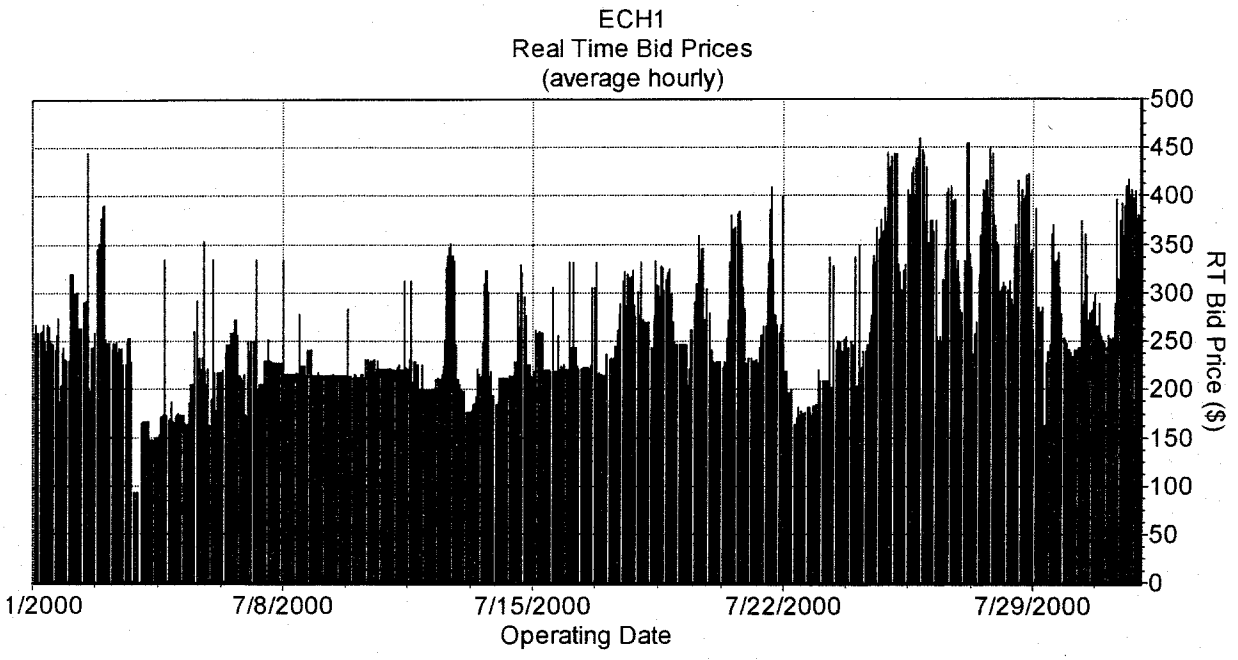
Figure 47



Q. Do you have examples of this aberrant bidding behavior for individual Dynegy units in July 2000?

A. Yes, the bidding patterns for specific Dynegy units were very similar to those that occurred in previous months. During certain periods no bids were submitted and during other periods of bid price spikes were submitted for Encina Units 1-4 and El Segundo Units 1-4. The combustion turbines were not bid into the real time market much of the time, and then were strategically bid in at near cap prices.

Q. What conclusion do you draw from Dynegy's bidding patterns in July, 2000?

A. I conclude that Dynegy's *bidding patterns were not consistent with competitive behavior. They were consistent with a strategy to withhold supply and to*

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increase market prices. Examples of these bidding patterns for Encina Unit 1 and the Encina GT can be seen in Figures 48 and 49 below.

Figure 48

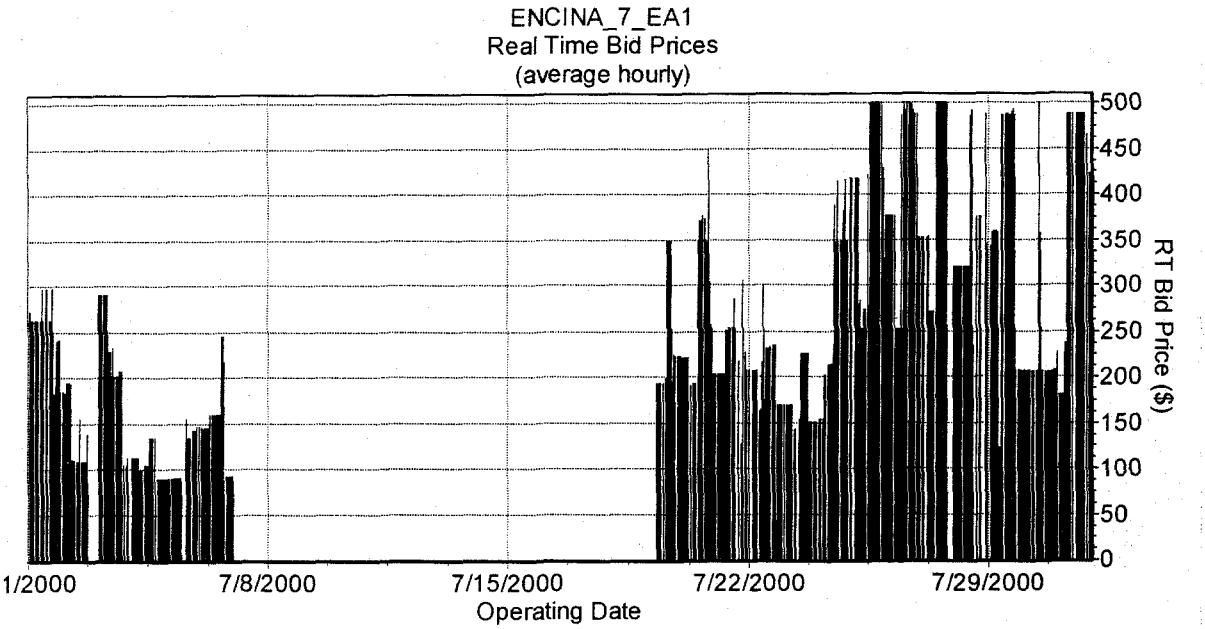
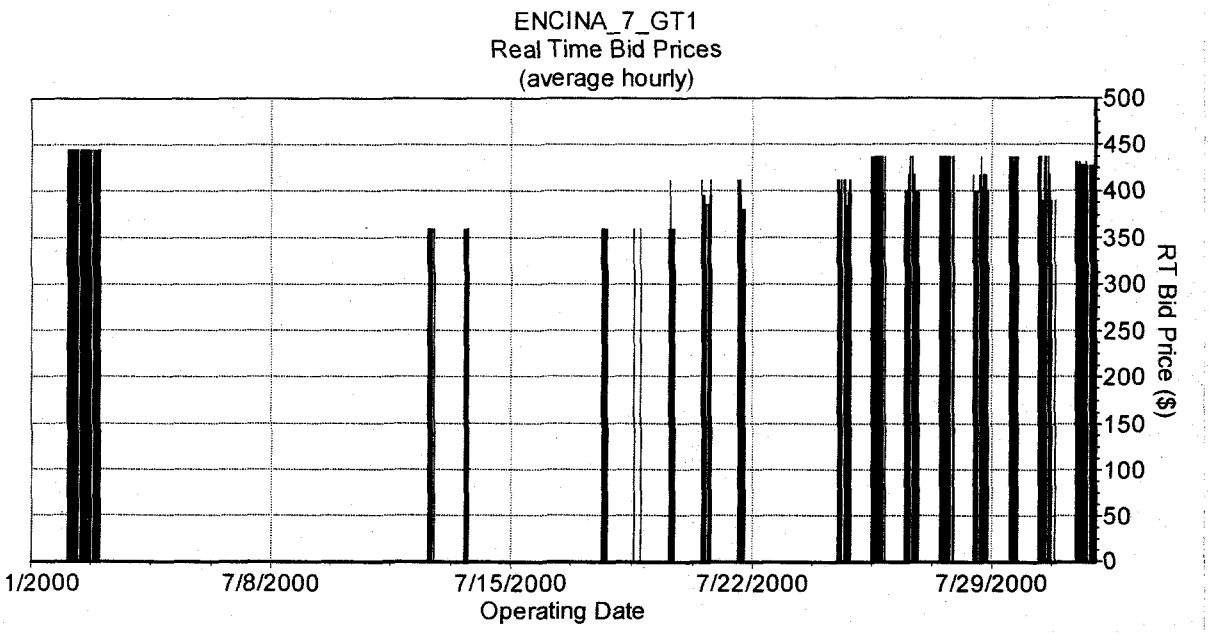


Figure 49



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E. August and September 2000

Q. What were Dynegy's bidding patterns in August and September, 2000?

A. In August and September, there was a continued pattern of not bidding certain units for multi-day periods. Since the price cap was $250, bid price spikes were not discernible during these months. Figures 50 and 51 show the hourly bid prices for Encina Unit 2 and El Segundo Unit 1.

Q. What else do Figures 50 and 51 tell us about Dynegy's bidding practices for these two months?

A. They show that there were prolonged periods during which these units were not bid at all into the real time market.

Figure 50

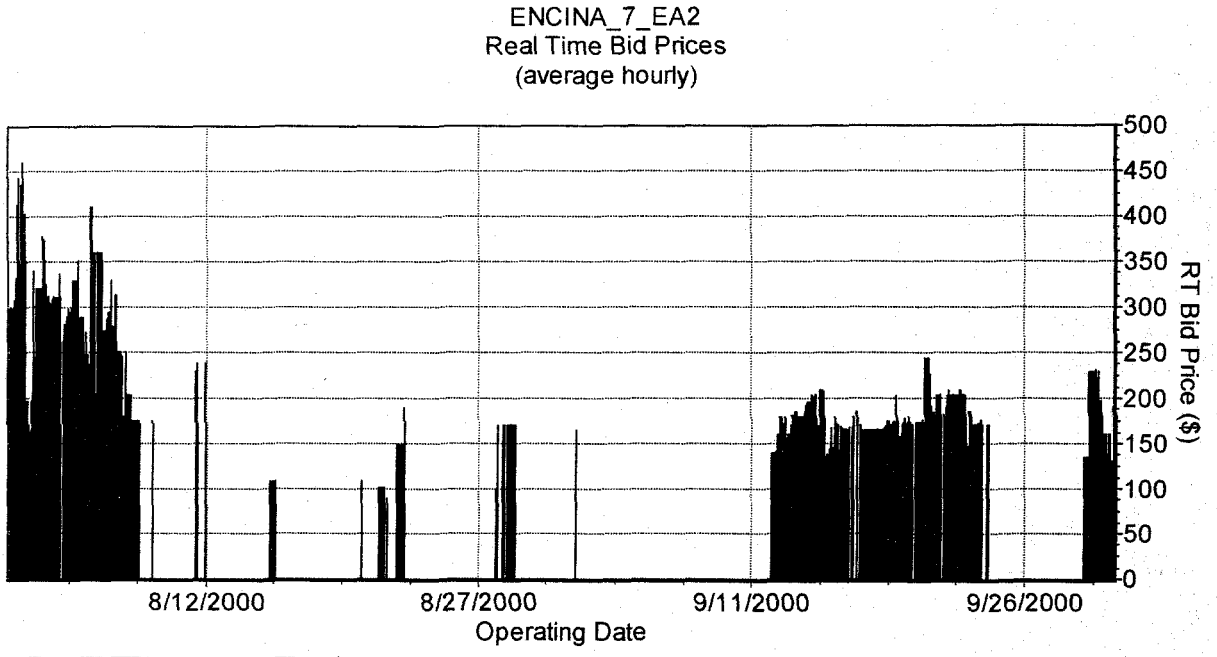

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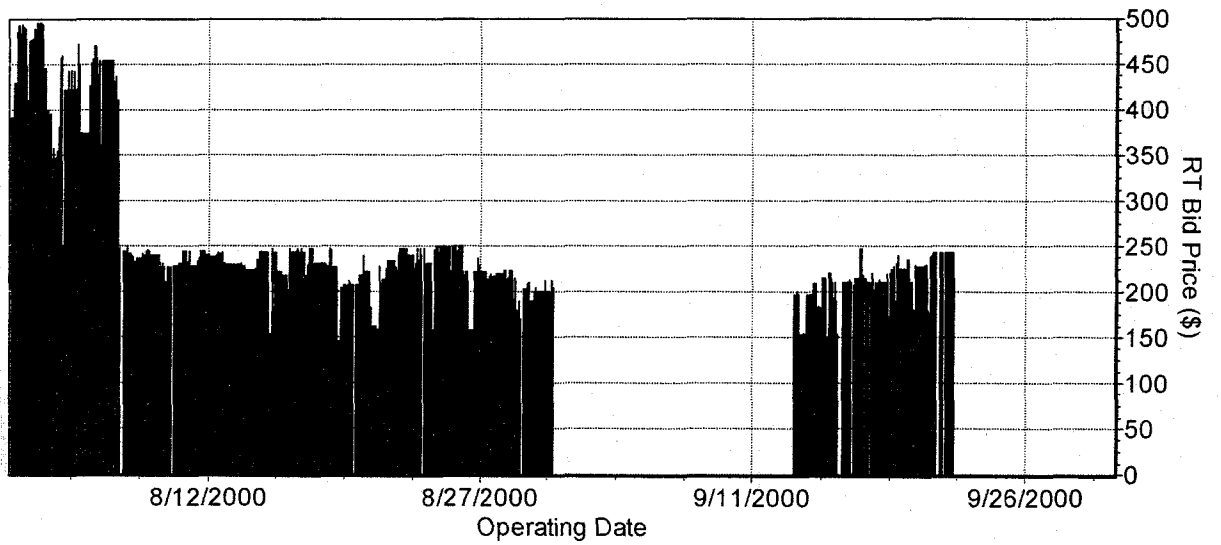
Figure 51

ELSEGN_7_UNIT 1
Real Time Bid Prices
(average hourly)



Q. Why would these units, Encina Unit 2 and El Segundo Unit 1, not be bid into the real time market during these periods?

A. There are two general reasons why a unit would not have been bid into the ISO real time market. First, a unit would not be bid into the real time market if it was not running or was not planned to be run (either because the unit had some kind of outage, or because it had not been previously started up). Second, a unit would not bid if it was already scheduled to run or was actually running at full capacity. (At times sellers made out-of-market (OOM) sales to the ISO outside of the real time market that would not show up in final hour-ahead schedules.) I examined the meter data for August and September, 2000 and found that there were multiple periods during which the metered output of the Dynegy Encina and El Segundo units was zero. These periods are listed below in Figure 52.

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Figure 52
Dynegy Units
Days with No Metered Output
August and September 2000

Unit	Capacity	Days with No Metered Output--August	Days with No Metered Output--September
ELSEGN_7_UNIT 1	175	Aug. 31	Sept. 1-12, Sept. 22-30
ELSEGN_7_UNIT 2	175	Aug. 5-6, Aug. 19-20, Aug. 31	Sept. 1-12, Sept. 22-25, Sept. 29-30
ELSEGN_7_UNIT 3	335	n.a.	n.a.
ELSEGN_7_UNIT 4	335	Aug. 23, Aug. 29-31	Sept. 1-5
ENCINA_7_EA1	103.5	n.a.	Sept. 23-28
ENCINA_7_EA2	103	n.a.	Sept. 2-11, Sept. 23-28
ENCINA_7_EA3	110	n.a.	n.a.
ENCINA_7_EA4	300	n.a.	n.a.
ENCINA_7_EA5	330	n.a.	n.a.

Q. During the days listed in Figure 52, could these units have been run?

A. For the most part, these units could have been bid into the real time market and could have been run. There are some exceptions. El Segundo Unit 4 and Encina Unit 1 were reported out for the days listed in Figure 52.

Q. You said the other reason that a unit would not bid into the market is because the unit was already running or was scheduled at full capacity. Were the Dynegy El Segundo and Encina units scheduled or running at full capacity in August and September?

A. No, these units were generally not running at full capacity. There are instances where units were not running at full capacity, and did not bid into the real time market. For example, there were no bids in the real time market on August 20 for Encina Unit 2 except in hour 12. On August 27 there were no bids in the real time market for Encina Unit 2 except for hours 23-24. However, Encina Unit 2, was scheduled and ran at levels far below its available capacity on both days.

Q. What conclusion do you draw from this behavior?

A. Dynegy's *failure to offer available capacity into the market during August - September, 2000 was not consistent with competitive behavior. It was consistent with a strategy to withhold supply and to increase market prices.*[21] Mr. Hanser (Exh. No. CA-9) and Dr. Reynolds (Exh. No. CA-5) provide more complete analyses of the impact and degree of such generator withholding patterns.[22]

VII. IN-STATE GENERATION OWNERS: WILLIAMS (WESC)

A. General Trends

Q. What were Williams's bidding patterns in the real time market during the summer of 2000?

A. Overall, Williams bid very high prices for all of its units. Throughout the May to September period, Alamitos Unit 7 and Huntington Beach Unit 5, both 133 MW combustion turbines, were almost always bid in at, or near, the prevailing ISO price cap.

Q. Did William's participation in the real time market remain constant over the summer of 2000?

A. No. As price caps were lowered from $750 in June, to $500 in July, and to $250 on August 7, the amount of MWhs that Williams bid into the real time market declined accordingly. Figure 53 shows the total MWhs that Williams bid into the real time market for all of its units during May - September, 2000

[21] Dynegy knew that in certain instances it had locational market power. *See* Exh. No. CA-190 which contains an e-mail discussing circumstances under which Dynegy traders are told to increase their bid prices.
[22] *See* Appendix B for Dynegy's bid prices in November and December, 2000.

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Figure 53
Williams Units
MWhs Bid into BEEP

Month	MWh Bid Into BEEP
May-00	748,873
Jun-00	929,827
Jul-00	745,736
Aug-00	316,914
Sep-00	336,412

B. May 2000

Q. What were William's bidding patterns in the real time market in May, 2000?

A. In May 2000, there were inexplicably high bid prices for almost all the Alamitos and Huntington Beach Units. Several units had average bid prices close to the $750 cap. These very same units were bid in at approximately one third of these prices in September 2000. Since gas costs and emissions permit costs were lower in May than in September and Williams was willing to produce energy at September bid prices, this change in bid prices is evidence that bid prices in May were far above the costs of these units. Bid prices for May and September are found in Figure 54 for each of William's units.

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Figure 54
Williams Units
Average BEEP Stack Prices ($)

UNIT	May-00 Bid Prices	Sep-00 Bid Prices
ALAMIT_7_UNIT 1	591.40	175.51
ALAMIT_7_UNIT 2	730.51	217.03
ALAMIT_7_UNIT 3	749.09	139.57
ALAMIT_7_UNIT 4	199.41	186.11
ALAMIT_7_UNIT 5	668.31	187.71
ALAMIT_7_UNIT 6	737.22	179.53
ALAMIT_7_UNIT 7	748.66	239.26
HNTGBH_7_UNIT 1	474.65	183.86
HNTGBH_7_UNIT 2	424.71	185.07
HNTGBH_7_UNIT 5	548.31	250.00
REDOND_7_UNIT 5	n.a.	n.a.
REDOND_7_UNIT 6	317.04	202.07
REDOND_7_UNIT 7	233.94	148.93
REDOND_7_UNIT 8	327.41	132.72

Q. Have you made any other observations about the average bid prices shown in Figure 54?

A. Yes, in May, Alamitos Unit 5 was bid in at an average price of $668.31, whereas Redondo Unit 7 was bid in at an average price of $233.94. This difference in average bid prices cannot be explained on a cost basis.

Q. Why can the difference in average bid prices not be explained on a cost basis?

A. Because both Alamitos Unit 5 and Redondo Unit 7 are 480MW units with roughly the same cost of production. Likewise, Alamitos Unit 4, a 320 MW unit located at the same plant also with a similar cost of production, was bid in at an average price of $199.41, whereas Alamitos Unit 5 was bid in at an average price of $668.31.

Q. What is the significance of the differences in these average bid prices?

A. It is another example of anti-competitive bidding behavior. The FERC pointed this out in its April 26 Order when discussing the anti-competitive nature of bids that vary in ways not related to the performance characteristics of a unit (April 26 Order, 95 FERC at 61,360):

> A variant of this pattern could be a single unit in a portfolio that is bid at an excessively high level compared to the remainder of the portfolio, without any apparent performance or input cost basis.

Q. Did Williams submit bid price spikes for its units in May 2000?

A. In May, 2000, there were several episodes of bid price spikes submitted by Williams. These occurred on May 1, May 3, May 4-5, May 6, May 10, and May 21-23 (ISO declared emergency on May 22). During these episodes, Williams spiked the bid prices on <u>all or a large number</u> of the units that were bid into the real time market. The bid price spikes can be seen in Figure 55 which shows the average hourly bid prices for all of William's units that were bid into the real time market in May.

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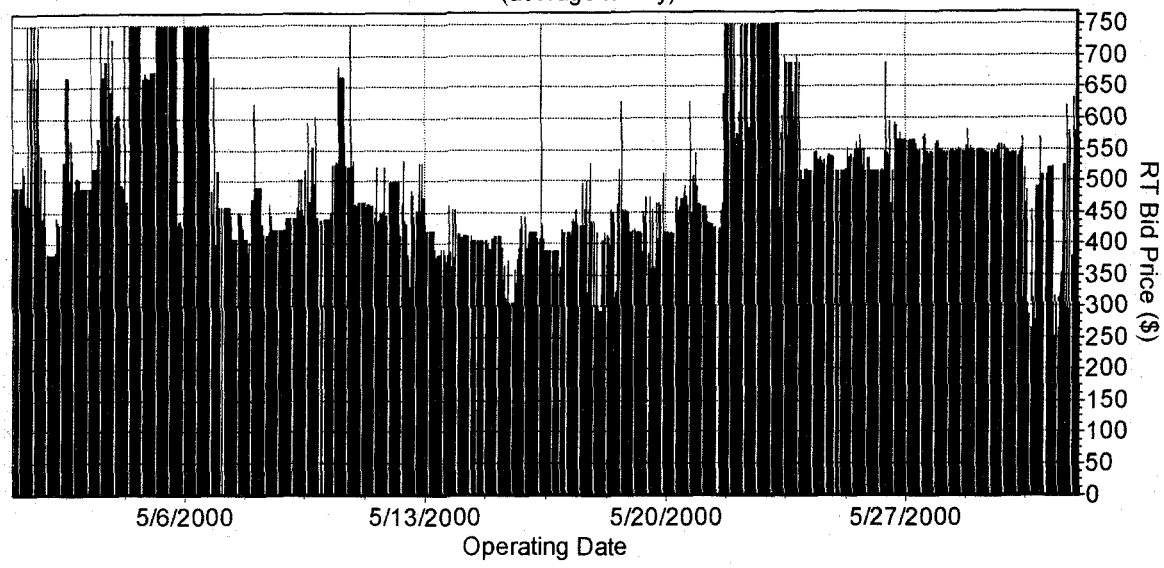
Figure 55



Q. Are there any other examples of Williams engaging in anti-competitive bidding strategies in May, 2000?

A. In addition to anti-competitive bidding behavior, there are three instances of abnormal drops in William's hour-ahead final schedules in May. These drops occurred on May 1-2, May 6-8, and May 28-29, 2000. These drops are similar to those that were observed as part of Reliant's market manipulation on June 21-22. These events are especially alarming since Mirant, LADWP, Powerex, and Dynegy all submitted bid price spikes into the market for one or more days on May 2-5, 28, and 30-31 as shown previously in Figure 7. To be clear, Williams' withdrawal of supply from the day-ahead markets on May 1-2 and 28-29 is followed by bid price spikes from other sellers. Figure 56 highlights the significant drops in the total MWhs scheduled by Williams as found in the final hour-ahead schedules.

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Figure 56
Williams Units
Total Final Hour-Ahead Energy
Scheduled by Day (MWh)

Date	Total Energy Scheduled
1-May-00	4,008
2-May-00	7,230
3-May-00	18,140
4-May-00	16,469
5-May-00	14,963
6-May-00	5,494
7-May-00	2,541
8-May-00	7,621
9-May-00	12,080
10-May-00	15,088
11-May-00	12,512
12-May-00	12,445
13-May-00	10,850
14-May-00	3,245
15-May-00	20,745
16-May-00	19,250
17-May-00	15,075
18-May-00	19,250
19-May-00	20,810
20-May-00	20,050
21-May-00	11,905
22-May-00	30,100
23-May-00	32,744
24-May-00	33,031
25-May-00	35,109
26-May-00	30,024
27-May-00	25,420
28-May-00	15,692
29-May-00	15,454
30-May-00	32,959
31-May-00	32,310

Q. What do you conclude about these three May events?

A. These events, both the drop in William's hour-ahead final schedules and the bid price spikes submitted by Williams and others, suggest that coordinated market

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manipulation was taking place. While further investigation would be necessary to definitely confirm coordination between Williams and others, the evidence is compelling that there was some kind of coordinated attempt to drive up market clearing prices in both early and late May, 2000.

C. June 2000

Q. What was William's bidding behavior in June, 2000?

A. In June, average bid prices remained high. For many Williams' units the bid price segments within bids varied dramatically - that is, there was significant hockey stick bidding. The average bid span (the difference between the minimum and maximum price segments within a bid) in June was greater than $100 for numerous units. See Figure 57.

Figure 57
Williams Units
June 2000

UNIT	Average Bid Price ($)	Average Bid Span ($)	Percent Hours Bid
ALAMIT_7_UNIT 1	551.63	83	43%
ALAMIT_7_UNIT 2	479.79	104	77%
ALAMIT_7_UNIT 3	344.32	94	49%
ALAMIT_7_UNIT 4	311.98	146	42%
ALAMIT_7_UNIT 5	466.90	145	42%
ALAMIT_7_UNIT 6	531.11	118	59%
ALAMIT_7_UNIT 7	747.94	0	97%
HNTGBH_7_UNIT 1	324.07	147	50%
HNTGBH_7_UNIT 2	321.25	123	70%
HNTGBH_7_UNIT 5	629.62	1	97%
REDOND_7_UNIT 5	500.60	155	2%
REDOND_7_UNIT 6	236.07	78	68%
REDOND_7_UNIT 7	190.74	123	52%
REDOND_7_UNIT 8	175.45	118	31%

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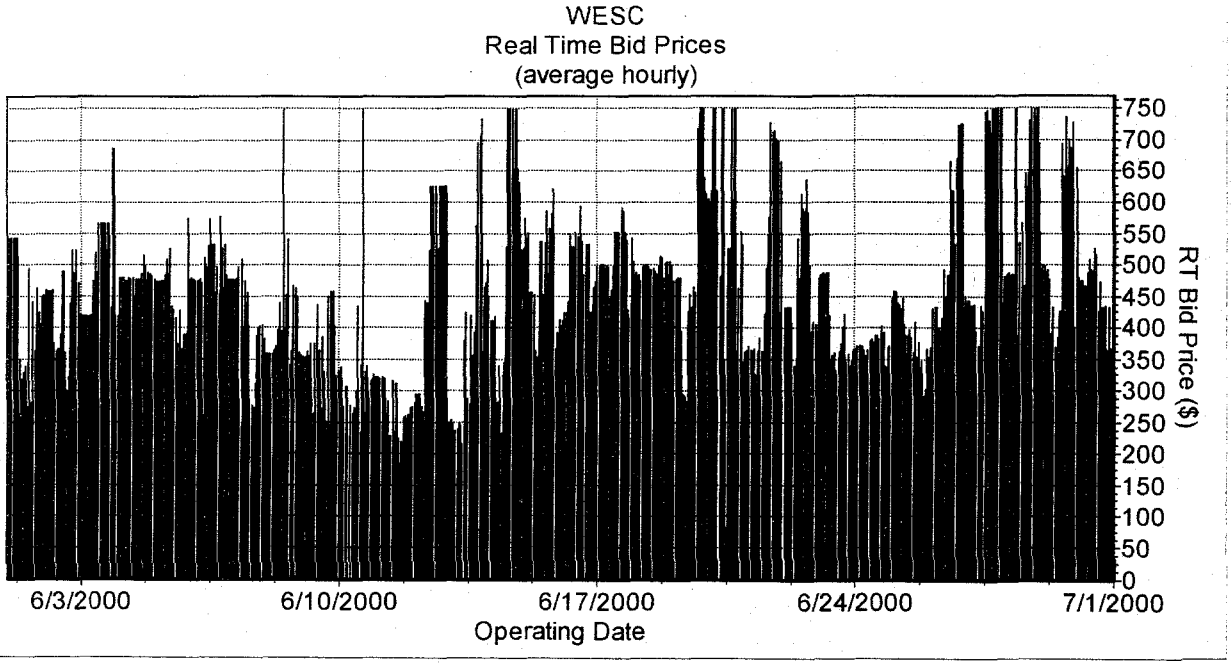
Q. Did Williams submit bid price spikes for its units in June, 2000?

A. Yes, in June, there were pronounced bid price spikes on June 3, June 12, June 13 (ISO declared emergency), June 14 (ISO declared emergency), June 20, June 21 (Reliant manipulation), June 22 (Reliant manipulation), June 26 (ISO declared emergency), June 27 (ISO declared emergency), June 28 (ISO declared emergency), and June 29 (ISO declared emergency). During these episodes, Williams increased the bid prices on all, or a large number, of its units that were bid into the real time market. Figure 58 illustrates the hourly average bids for all of William's units in June 2000.

Figure 58



Q. Did Williams employ the "no bid/spike" anti-competitive bidding strategy in June 2000?

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A. Yes, in June and throughout the summer, Williams offered smaller amounts of energy into the real time market during peak hours, than during off-peak hours. It appears that Williams sold energy in other markets during peak hours. Thus, when examining the bidding behavior of individual Williams' units, it appears that they were implementing a "no bid/spike" strategy. Part of the explanation for such behavior may be the result of the unit's contractual position. Nonetheless, there were still instances of anti-competitive elevated bidding and anti-competitive bid price spikes in the unit level data. Figures 59 and 60 show the hourly bid prices of Williams' Huntington Beach Unit 1 and Alamitos Unit 3 in June, 2000.

Figure 59

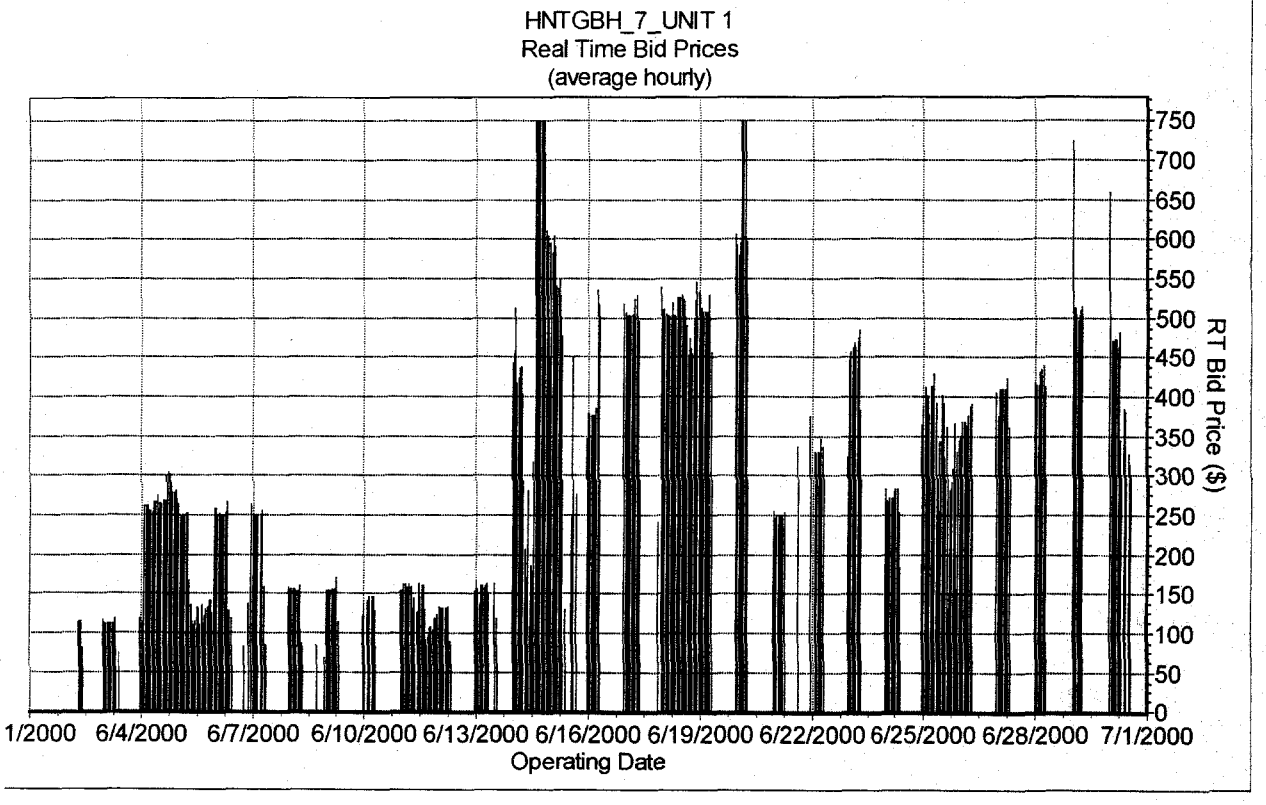

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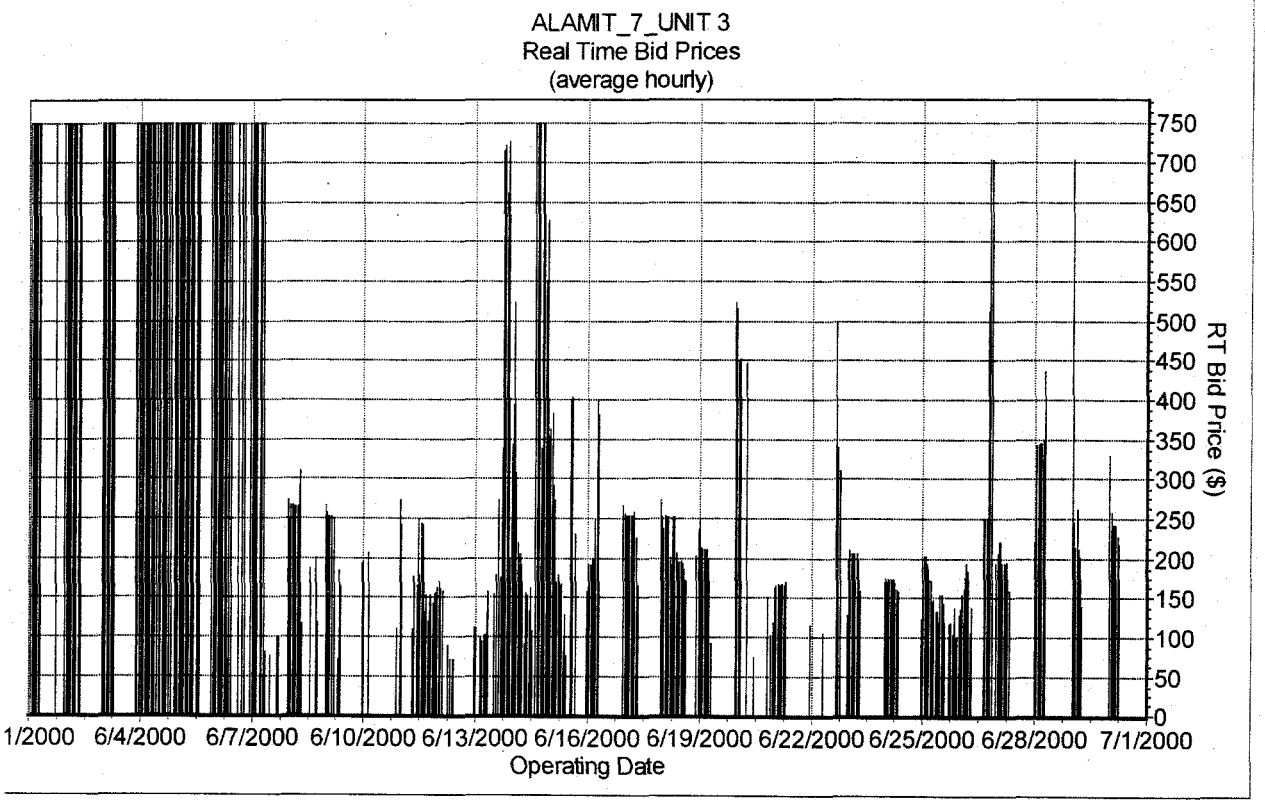
Figure 60



D. July 2000

Q. Did Williams continue to submit bid price spikes into the ISO real time market in July 2000?

A. In July, there were pronounced bid price spikes on July 7, July 13-14, July 18, July 19-20 (ISO declared emergency), July 24 (ISO declared emergency), July 25-26 (ISO declared emergency on July 25), July 27, July 28 (ISO declared emergency), July 29, and July 31 (ISO declared emergency). During these episodes Williams increased the bid prices on <u>all or a large number</u> of its units that were bid into the real time market. Figure 61 illustrates the July, 2000 hourly average bid prices for all of William's units.

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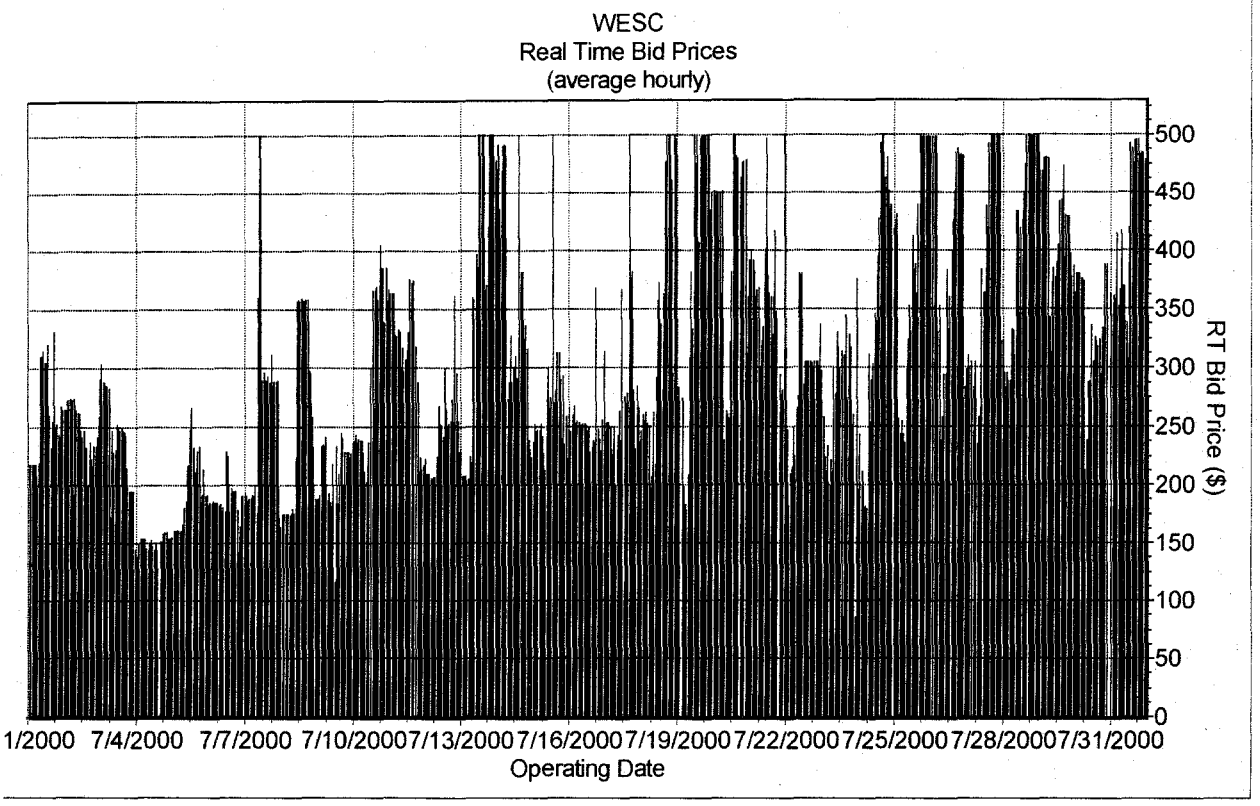
Figure 61



E. August and September 2000

Q. Did Williams submit bid price spikes for its units after July, 2000?

A. After the ISO price cap was lowered to $250 on August 7, many units were bid at or near the $250 cap on numerous days for the duration of August and September, 2000. Therefore, there were no prominent price spikes. Nevertheless, in August, during the first week when the price cap was still at $500, there were two episodes of price spikes on August 1-2 and August 5-6. The first four days of August were ISO emergency days.

Q. Did Williams ever fail to submit a bid for any of its units during certain hours in August and September, 2000?

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A. In August, 2000 there were five instances in which Williams failed to submit any bids from any of its units into the ISO real time market. During the following month of September, there were hours on most days in which Williams failed to submit any bids into the real time market. Figure 62 lists the days that various units had no metered output.

Q. Did this observation of the absence of bids surprise you?

A. No, I am not surprised given the extraordinarily large amount of Williams generating capacity that was not producing energy during August - September, 2000. Figure 62 lists the Williams units had no metered output during certain days in August and September.

Figure 62
Williams Units
Days with No Metered Output
August and September 2000

UNIT	CAPACITY	DAYS WITH NO METERED OUTPUT
ALAMIT_7_UNIT 1	175	Aug. 11 – Sept. 28
ALAMIT_7_UNIT 2	175	Aug. 11 – Sept. 4
ALAMIT_7_UNIT 4	320	Aug. 25 – Sept. 8
ALAMIT_7_UNIT 5	480	Sept. 28 – Sept. 30
ALAMIT_7_UNIT 7	133	Aug. 11 – Sept. 30*
APPGEN_6_UNIT 2	64	Aug. 1 – Sept. 30
HNTGBH_7_UNIT 1	215	Sept. 9 – Sept. 30
HNTGBH_7_UNIT 5	133	Aug. 2 – Sept. 30**
REDOND_7_UNIT 5	175	Aug. 2 – Aug. 28, Aug. 31 – Sept. 30
REDOND_7_UNIT 6	175	Sept. 6 – Sept. 18, Sept. 26 – Sept. 30
REDOND_7_UNIT 7	480	Aug. 8 – Aug. 15
REDOND_7_UNIT 8	480	Aug. 18 – Sept. 17

*Alamitos Unit 7 ran for 14 isolated hours during this period.

**Huntington Beach Unit 5 ran for 2 isolated hours during this period.

Q. Please describe the implications of Figure 62.

A. Referring to Figure 62, on August 25 and 26 for example, Williams had 1655 MW of capacity idle, or 40% of its total capacity. On these two days, there were ISO-declared emergencies. On September 12, 13, and 14, also ISO emergency days, Williams had 1550 MW of capacity idle. This high level of non-participation, particularly during ISO declared emergencies, is troubling. For the most part, these Williams' units were reported out (non-functional) during August 25-26 and September 12-14 (the exceptions being APPGEN_6_UNIT 2 which was available but not run, and ALAMITOS_7_UNIT 7 which was either partially or fully available but not run). Regardless of the reported status of these units, the number and duration of these outages raises serious market power questions.

Q. Do you have any final comments on William's bidding behavior during the summer of 2000?

A. I would like to briefly summarize Williams bidding behavior during the summer of 2000. In May 2000, Williams engaged in what appears to be a series of attempts to manipulate market prices by withdrawing supply from the PX day-ahead markets, and bidding price spikes into the ISO real time market. During the next two months, June and July, Williams used bid price spikes extensively with most of its units. When, in August, price caps were lowered to $250, many of William's units stopped producing output.[23]

[23] *See* Appendix B for Williams' bid prices in November and December, 2000.

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VIII. IN-STATE GENERATION OWNERS: DUKE (DETM)

A. Summer 2000

Q. What were Duke's bidding patterns in the ISO real time market in the summer 2000?

A. Compared to its four in-state counterparts, Williams, Dynegy, Mirant, and Reliant, Duke submitted low bid prices for its units during the summer of 2000. The bid prices appear to be more consistent with actual marginal cost. Figure 63 shows the average hourly bid prices for Duke's units in the summer of 2000. Note that in September there was a clear increase in bid prices relative to the previous month.

Figure 63
Duke Units
Average BEEP Stack Bid Prices

	May-00	Jun-00	Jul-00	Aug-00	Sep-00
MORBAY_7_UNIT 1	39.00	66.16	57.64	64.08	79.03
MORBAY_7_UNIT 2	39.00	62.72	60.60	67.80	72.95
MORBAY_7_UNIT 3	n.a.	69.14	60.12	67.17	64.86
MORBAY_7_UNIT 4	64.25	59.39	64.89	59.68	117.84
MOSSLD_7_UNIT 6	126.43	134.06	57.82	68.52	77.63
MOSSLD_7_UNIT 7	50.65	67.16	65.06	65.97	72.05
SOBAY_7_GT1	169.64	165.97	161.42	173.82	227.18
SOBAY_7_SY1	76.18	93.65	118.99	71.81	113.65
SOBAY_7_SY2	59.82	79.66	236.99	58.53	96.33
SOBAY_7_SY3	250.00	121.98	133.06	80.47	124.61
SOBAY_7_SY4	54.60	83.13	105.71	89.77	131.68

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Figure 64
Duke Units
Percentage Hours Bid

	May-00	Jun-00	Jul-00	Aug-00	Sep-00
MORBAY_7_UNIT 1	0%	2%	7%	19%	24%
MORBAY_7_UNIT 2	0%	6%	12%	16%	12%
MORBAY_7_UNIT 3	n.a.	11%	11%	21%	7%
MORBAY_7_UNIT 4	3%	12%	7%	17%	9%
MOSSLD_7_UNIT 6	3%	26%	76%	58%	67%
MOSSLD_7_UNIT 7	3%	73%	14%	44%	59%
SOBAY_7_GT1	88%	69%	75%	98%	51%
SOBAY_7_SY1	4%	6%	10%	10%	13%
SOBAY_7_SY2	5%	6%	9%	7%	10%
SOBAY_7_SY3	0%	9%	10%	9%	8%
SOBAY_7_SY4	2%	11%	7%	9%	6%

2
3 Q. Why was Duke's participation in the real time market so small for its Morro Bay
4 and South Bay units other than the South Bay GT?

5 A. Duke participated heavily in the bilateral forward markets, locking in electric
6 and gas prices for fixed quantities of supply. This is explained in more detail in
7 the deposition of Mr. Fliflet.[24] Duke's hedging strategy was very profitable in
8 the summer of 2000 which implies that forward as well as spot electricity prices
9 were at above normal levels. Exh. No. CA-199 contains a Dow Jones
10 Newswires Article about the 10 most profitable companies in the California
11 electricity markets in the summer of 2000. Duke was on that list.[25]

12 Q. Regarding the real time bid prices listed in Figure 63, how do Duke's bid prices
13 compare to those submitted by other in-state generators, for example, how do
14 they compare with Williams' bid prices?

15 A. There are significant differences between the two as shown in Figure 65. For
16 example, there is a notable discrepancy between the bid prices of the Williams

[24] *See* Exh. No. CA-134.
[25] Exh. No. CA-163 contains an e-mail discussing Duke's hedges and profits in August 2000.

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peaking units Alamitos Unit 7 and Huntington Beach Unit 5 and the Duke peaking unit, the South Bay GT. These peaking units have roughly the same cost of production. There is also a sizeable difference in bid prices between Williams Alamitos Units 1-2 and Duke Morro Bay Units 1-2, again, units with roughly the same costs of production.

Figure 65
Average BEEP Stack Bid Prices

WILLIAMS	Unit Capacity*	May-00	Jun-00	Jul-00
ALAMIT_7_UNIT 1	175	591.40	551.63	410.84
ALAMIT_7_UNIT 2	175	730.51	479.79	292.00
ALAMIT_7_UNIT 3	320	749.09	344.32	121.57
ALAMIT_7_UNIT 4	320	199.41	311.98	215.56
ALAMIT_7_UNIT 5	480	668.31	466.90	215.43
ALAMIT_7_UNIT 6	480	737.22	531.11	210.03
ALAMIT_7_UNIT 7	133	748.66	747.94	500.00
HNTGBH_7_UNIT 1	215	474.65	324.07	250.69
HNTGBH_7_UNIT 2	215	424.71	321.25	241.38
HNTGBH_7_UNIT 5	133	548.31	629.62	497.85
REDOND_7_UNIT 5	175	n.a.	500.60	226.23
REDOND_7_UNIT 6	175	317.04	236.07	206.37
REDOND_7_UNIT 7	480	233.94	190.74	143.86
REDOND_7_UNIT 8	480	327.41	175.45	164.80
DUKE				
MORBAY_7_UNIT 1	170	39.00	66.16	57.64
MORBAY_7_UNIT 2	170	39.00	62.72	60.60
MORBAY_7_UNIT 3	345	n.a.	69.14	60.12
MORBAY_7_UNIT 4	345	64.25	59.39	64.89
MOSSLD_7_UNIT 6	740	126.43	134.06	57.82
MOSSLD_7_UNIT 7	740	50.65	67.16	65.06
SOBAY_7_GT1	15	169.64	165.97	161.42
SOBAY_7_SY1	146	76.18	93.65	118.99
SOBAY_7_SY2	150	59.82	79.66	236.99
SOBAY_7_SY3	175	250.00	121.98	133.06
SOBAY_7_SY4	222	54.60	83.13	105.71

*As reported in Exhibit No. ISO-7 (Refund Proceeding)

1 Q. Why would Duke have an incentive to bid close to marginal cost?

2 A. Since a large portion of Duke's output was already committed under fixed price
3 forward contracts in the summer of 2000, Duke would have less of an incentive
4 to manipulate spot market prices.

5 Q. Did Duke ever submit bid price spikes into the real time market in the summer
6 of 2000?

7 A. There are a number of days during some hours that Duke submitted anti-
8 competitive bid price spikes or did not submit any bids at all into the real time
9 market. However, this occurred far less frequently in Duke's case than for the
10 other in-state generators.

11 **B. Fall 2000 Through June 2001**

12 Q. After the summer of 2000, in the latter part of the year, and during 2001, did
13 Duke's bidding behavior change?

14 A. Yes. There was a change in Duke's bidding behavior starting in November
15 2000. Duke started increasing bid prices, and by January 2001, Duke was
16 consistently submitting bids over $1000/MWh. The change in bidding behavior
17 was likely caused by the unwinding of Duke's previous forward positions. With
18 more energy available to be sold at spot prices, and with the newly implemented
19 pay-as-bid system[26], Duke had the incentive to submit high bid prices. The
20 following tables show the change in average bid prices. Figures 66 and 67 list
21 Duke's monthly average bid prices in the years 2000 and 2001, respectively.

22

[26] On December 8, 2000 the ISO implemented the soft cap pricing method. Under this pricing method, bids above the $250 price cap that were accepted by the ISO were paid their bid price. On January 1, 2001, the soft cap was lowered to $150.

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Figure 66
Duke Units
Average BEEP Stack Bid Prices
Year 2000 ($)

UNIT	Jun-00	Oct-00	Nov-00	Dec-00
MORBAY_7_UNIT 1	66.16	74.20	222.54	412.60
MORBAY_7_UNIT 2	62.72	61.79	217.11	474.27
MORBAY_7_UNIT 3	69.14	58.94	155.31	426.05
MORBAY_7_UNIT 4	59.39	53.64	204.38	419.93
MOSSLD_7_UNIT 6	134.06	n.a.	n.a.	n.a.
MOSSLD_7_UNIT 7	67.16	9.63	21.47	486.36
SOBAY_7_GT1	165.97	n.a.	199.56	564.11
SOBAY_7_SY1	93.65	70.22	214.03	429.30
SOBAY_7_SY2	79.66	88.69	n.a.	n.a.
SOBAY_7_SY3	121.98	76.33	190.79	469.22
SOBAY_7_SY4	83.13	102.12	120.21	594.19

Figure 67
Duke Units
Average BEEP Stack Bid Prices
Year 2001 ($)

UNIT	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01
MORBAY_7_UNIT 1	663.58	1170.00	n.a.	n.a.	75.00	n.a.
MORBAY_7_UNIT 2	324.84	1140.10	2100.00	1255.00	94.00	n.a.
MORBAY_7_UNIT 3	522.86	1065.00	2100.00	n.a.	n.a.	n.a.
MORBAY_7_UNIT 4	557.32	1065.00	429.37	n.a.	75.00	n.a.
MOSSLD_7_UNIT 6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
MOSSLD_7_UNIT 7	902.48	1335.00	n.a.	n.a.	n.a.	n.a.
SOBAY_7_GT1	730.28	1445.00	n.a.	n.a.	n.a.	n.a.
SOBAY_7_SY1	914.42	1540.00	n.a.	n.a.	130.00	n.a.
SOBAY_7_SY2	1289.16	1540.00	n.a.	n.a.	136.00	n.a.
SOBAY_7_SY3	n.a.	n.a.	n.a.	n.a.	126.00	n.a.
SOBAY_7_SY4	3693.44	3880.00	n.a.	n.a.	n.a.	n.a.

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IX. IMPORTERS: ENRON (EPMI)

Q. Please describe Enron's participation in the ISO real time market during the January 2000 to June 2001 period.

A. Enron was active in the ISO real time market throughout the year 2000. In January 2001, it virtually ceased its participation and began making sales to CERS.[27] Figure 68 shows the quantity of MWhs bid into the real time market by Enron in each month from January 2000 to June 2001. Enron's participation is greatest in the months of June – September, 2000.

Figure 68
Enron
Total MWhs Bid into the Real Time Market

Month	MWh
Jan-00	22,270
Feb-00	30,484
Mar-00	33,519
Apr-00	17,635
May-00	35,339
Jun-00	51,025
Jul-00	38,588
Aug-00	61,951
Sep-00	68,922
Oct-00	28,444
Nov-00	30,581
Dec-00	8,907
Jan-01	50
Feb-01	0
Mar-01	0
Apr-01	0
May-01	1,136
Jun-01	0

Q. Did Enron submit bid price spikes into the real time market?

[27] Exh. No. CA-14 (Appendix A).

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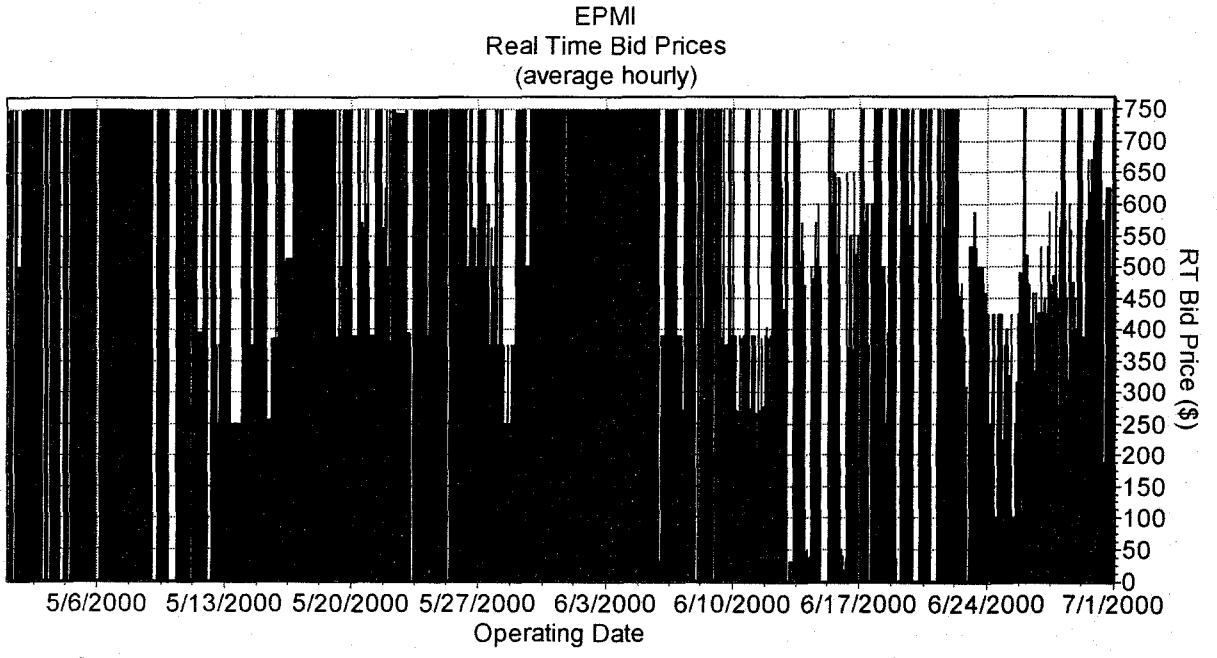
A. Yes, from January – April 2000, Enron bid into the real time market almost exclusively at the then-prevailing ISO price cap of $750. This bidding pattern continued into May and June, 2000. Figure 69 shows average hourly bid prices for Enron imports in May and June.

Figure 69



Q. Did Enron continue to bid high prices through the summer of 2000?

A. From July through September 2000, there was more variability in Enron's hourly average bid prices. The average, however, continued to hit the ISO price cap in many hours. Enron's average hourly bid prices for July through September 2000 are shown in Figure 70.

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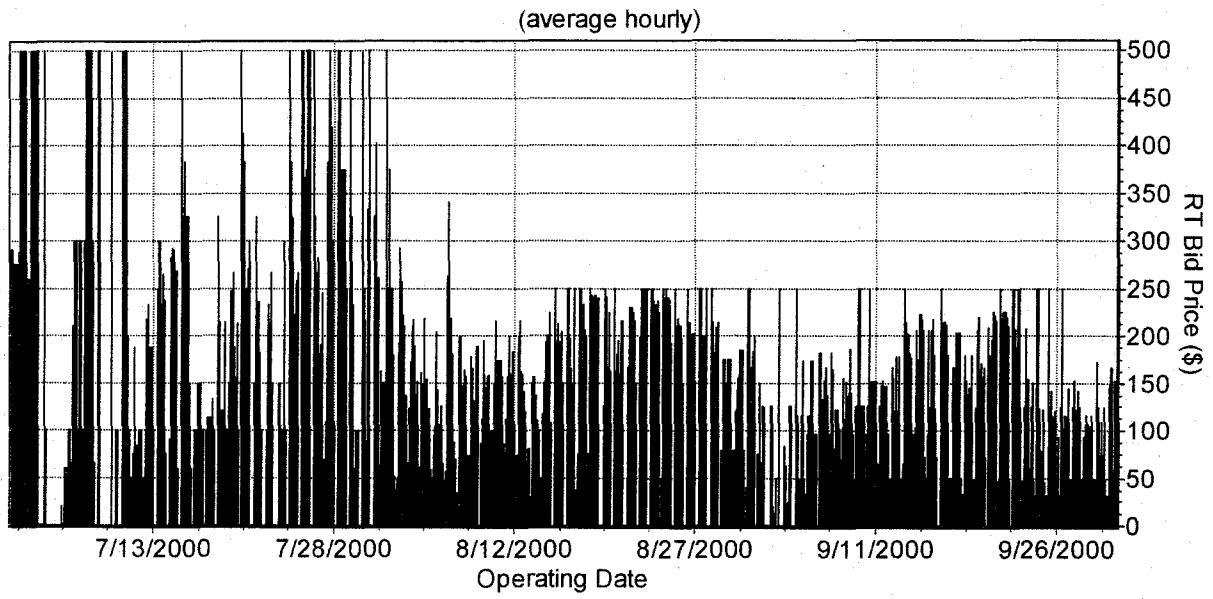
Figure 70



Q. Please describe Enron's bidding behavior for the remainder of 2000.

A. Enron's average hourly bid prices remained at or below $250 through the rest of the year. Enron's participation in the ISO real time market dropped sharply in December, 2000.

X. IMPORTERS: POWEREX (PWRX)

A. General Trends

Q. Please describe Powerex's participation in the ISO real time market during the January 2000 to June 2001 period.

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A. Powerex was active in the ISO real time market throughout 2000. In 2001, it ceased this participation, and commenced making sales to CERS.[28] Figure 71 shows the quantity of MWhs bid into the real time market by Powerex in each month from January 2000 to June 2001.

Figure 71
Powerex
Total MWh Bid into Real Time Market

Month	MWh
Jan-00	992,088
Feb-00	1,070,959
Mar-00	989,275
Apr-00	824,883
May-00	1,129,001
Jun-00	1,305,734
Jul-00	1,095,083
Aug-00	942,440
Sep-00	724,196
Oct-00	417,984
Nov-00	648,786
Dec-00	199,949
Jan-01	1,800
Feb-01	0
Mar-01	0
Apr-01	0
May-01	0
Jun-01	0

B. January through April 2000

Q. Please describe Powerex's bidding behavior in the real time market during the first four months of 2000.

[28] Powerex was the largest seller by volume to CERS during the January 17, 2001 to June 20, 2001 period. *See* Exh. No. CA-14 (Appendix A).

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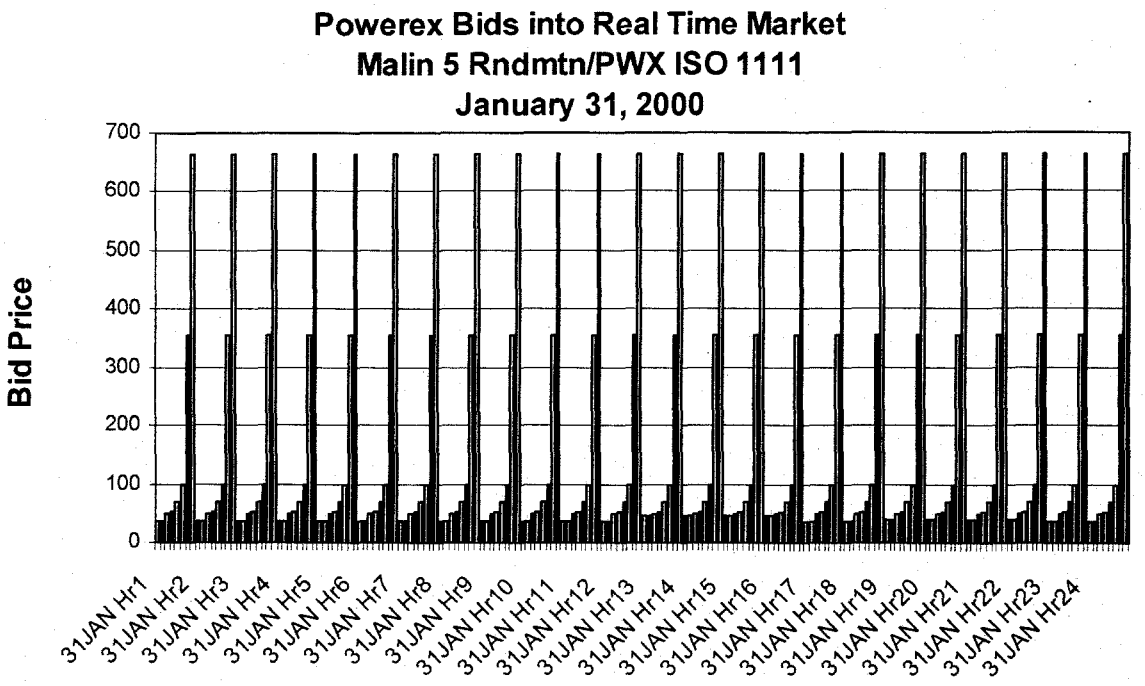
A. Powerex's bids into the real time market during the period January 2000 – April 2000 can be characterized generally as very consistent "hockey stick" bidding. A representative example of this pattern is shown below for energy bid into the real time market at Malin on January 1, 2000.

Figure 72



C. May 2000

Q. Does this bidding pattern change after April 2000?

A. At the end of April, average bid prices submitted by Powerex into the real time market increased. Starting on April 25, 2000, as seen in Figure 73, the average level of Powerex bid prices increased sharply and stayed elevated through May

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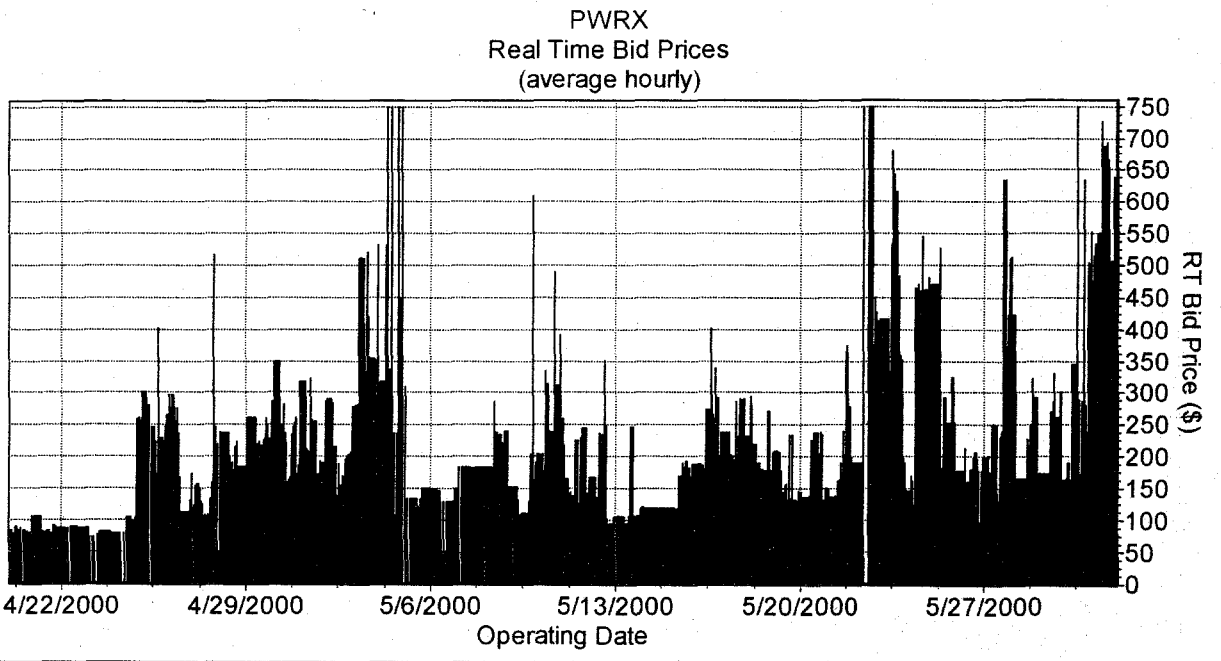
5, 2000. In May, there were pronounced bid price spikes on May 3, May 4, May 22 (ISO declared emergency), May 23, May 24-25, May 27-28, May 30, and May 31. During these episodes, Powerex increased the bid prices on all or a large number of units (i.e., import IDs) that were bid into the ISO real time market. Average hourly bid prices for Powerex imports for the period April 20 through May 31 are shown in Figure 73.

Figure 73



Q. Have you looked more closely at Powerex's bidding behavior during the ISO emergency on May 22, 2000?

A. Yes. On May 22, Powerex vastly reduced the amount of energy that it offered into the real time market. In fact, Powerex offered no energy in a few hours. During those hours that Powerex did offer a small amount of energy, it was offered at extremely high prices. By withdrawing approximately 1000 MW of energy that it typically offered to the real time market, Powerex clearly played a

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key role in causing this emergency. Figures 74 and 75 show the detailed hourly bid prices and bid quantities on May 22, 2000, respectively.

Figure 74

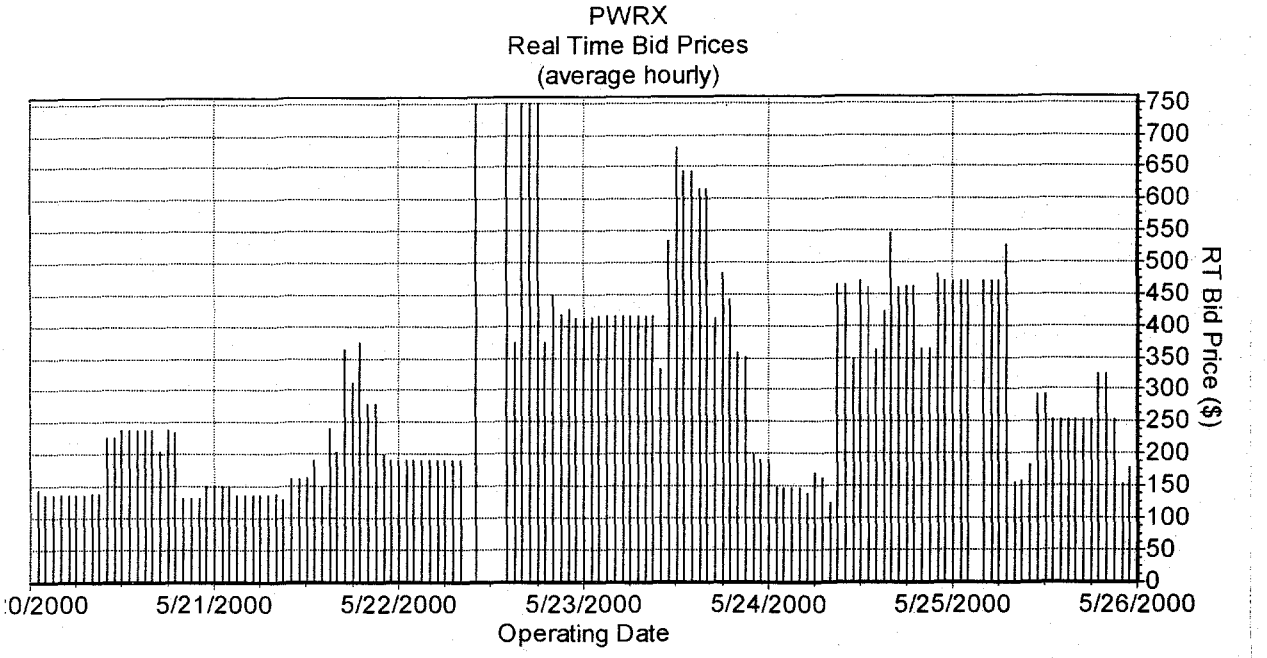
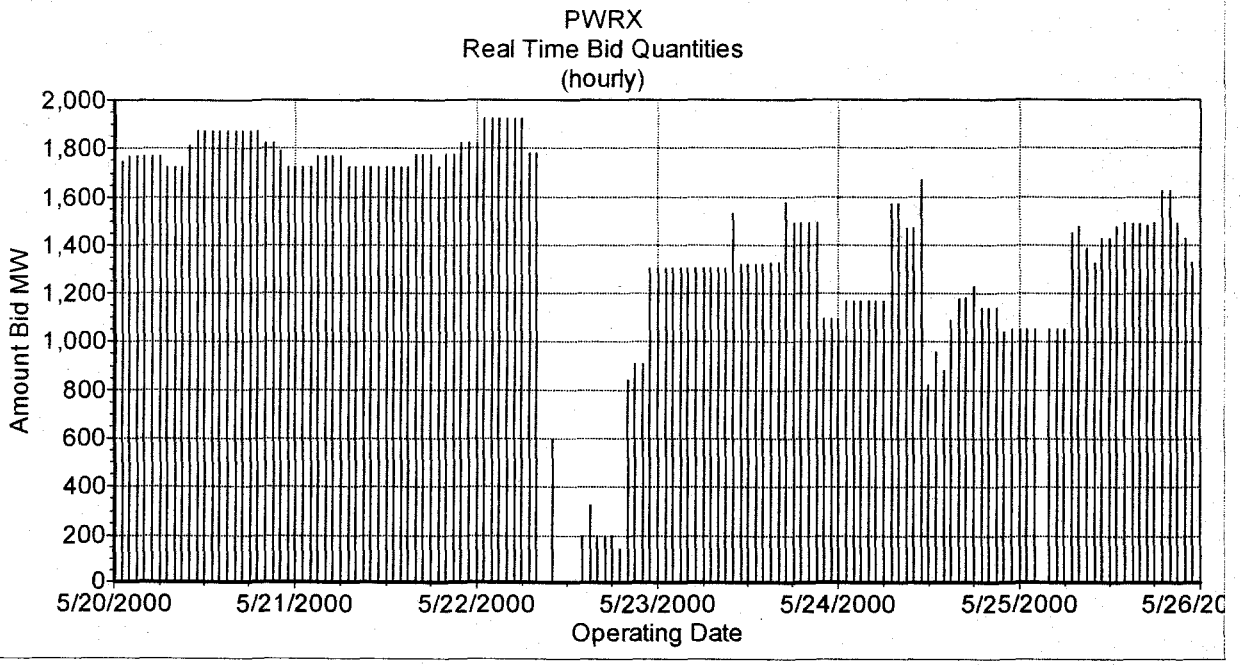


Figure 75



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D. June 2000

Q. Did Powerex submit bid price spikes into the ISO real time market in June, 2000?

A. In June, Powerex submitted pronounced bid price spikes on June 1-2, June 3, June 4, June 13-14 (ISO declared emergency), June 15, June 20, June 21 (ISO declared emergency), June 22 (ISO declared emergency), June 22-23, June 25, June 26 (ISO declared emergency), June 26-27 (ISO declared emergency). During these episodes, Powerex increased the bid prices on all or a large number of units (i.e., import IDs) that were bid into the real time market.

Q. Did Powerex engage in any other anti-competitive bidding behavior in June?

A. Yes. On June 15, 2000, Powerex inexplicably bid over 10,000 MW into the real time market for several hours. See Figure 76. A more detailed review of bidding on this day during hours 9 – 19 reveals an aberrant behavioral pattern.

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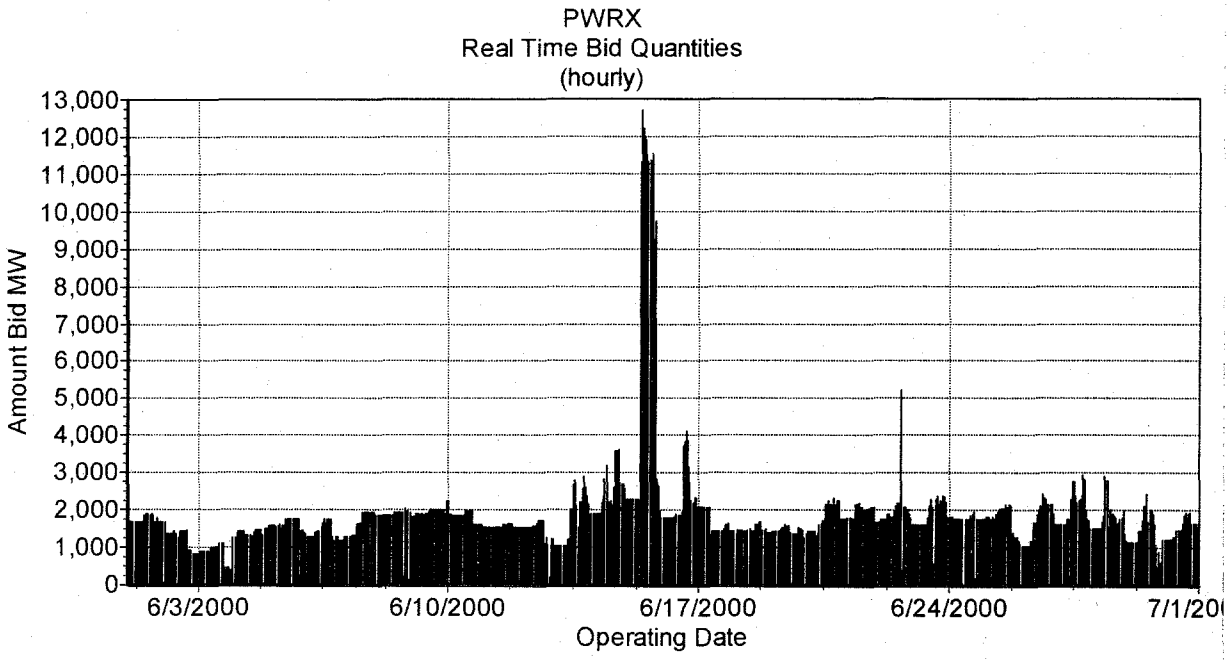
Figure 76



During hour 8 on June 15, 2000, Powerex did not submit any bids into the ISO real time market. Then, in hour 9, Powerex submitted bids for 4000 MW at $750 on the MALIN_5_RNDMTN interchange, and for 5000 MW at $750 on the SYLMAR_2_NOB interchange. Similar bids were made in the next hour. In hour 11, Powerex changed the nature of its bids at MALIN_5_RNDMTN by bidding a large quantity, 4895 MW, but did so at a negative $750. The bids at SYLMAR_2_NOB remain the same. In hour 14, Powerex reversed this pattern. The large negative incremental bid was made at SYLMAR_2_NOB, and the bids at MALIN_5_RNDMTN are again positive. Variations of this bidding pattern were repeated through hour 19. A list of the detailed bids is provided in Figure 77.

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Figure 77
Powerex
Bids into the Real Time Market
June 15, 2000

Date	Hour	Interchange ID	Inc or Dec MWh	Bid Price
6/15/2000	9	MALIN_5_RNDMTN	4000	$750
6/15/2000	9	MALIN_5_RNDMTN	1200	< $750
6/15/2000	9	MALIN_5_RNDMTN	-990	$750
6/15/2000	9	MALIN_5_RNDMTN	-235	($750)
6/15/2000	9	MALIN_5_RNDMTN	-50	($145.21)
6/15/2000	9	SYLMAR_2_NOB	5000	$750
6/15/2000	9	SYLMAR_2_NOB	900	< $750
6/15/2000	9	SYLMAR_2_NOB	-1000	$750
6/15/2000	9	SYLMAR_2_NOB	-235	($750)
6/15/2000	9	SYLMAR_2_NOB	-50	($145.22)
6/15/2000	11	MALIN_5_RNDMTN	400	$750
6/15/2000	11	MALIN_5_RNDMTN	4895	($750)
6/15/2000	11	MALIN_5_RNDMTN	-950	$750
6/15/2000	11	MALIN_5_RNDMTN	-275	($750)
6/15/2000	11	MALIN_5_RNDMTN	-50	($145.21)
6/15/2000	11	SYLMAR_2_NOB	5750	$750
6/15/2000	11	SYLMAR_2_NOB	900	< $750
6/15/2000	11	SYLMAR_2_NOB	-1000	$750
6/15/2000	11	SYLMAR_2_NOB	-235	($750)
6/15/2000	11	SYLMAR_2_NOB	-50	($145.22)
6/15/2000	14	MALIN_5_RNDMTN	4000	$749
6/15/2000	14	MALIN_5_RNDMTN	600	($750)
6/15/2000	14	MALIN_5_RNDMTN	-950	$750
6/15/2000	14	MALIN_5_RNDMTN	-40	$749
6/15/2000	14	MALIN_5_RNDMTN	-235	($750)
6/15/2000	14	MALIN_5_RNDMTN	-50	($145.21)
6/15/2000	14	SYLMAR_2_NOB	1600	$750
6/15/2000	14	SYLMAR_2_NOB	4850	($750)
6/15/2000	14	SYLMAR_2_NOB	-960	$750
6/15/2000	14	SYLMAR_2_NOB	-305	($750)
6/15/2000	14	SYLMAR_2_NOB	-50	($145.22)

Q. Is it possible to import 4000 MWhs over the MALIN_5_RNDMTN interchange or 5000 MWhs over the SYLMAR_2_NOB interchange?

A. No. The MALIN_5_RNDMTN interchange cannot carry 4000 MWh of energy nor can SYLMAR_2_NOB carry 5000 MWh. There is little other explanation for these bids other than an intent to manipulate energy flows or market prices. In discovery, Powerex stated that it never made infeasible incremental bids into the real time market.

> **CAL-PWX-79**. Did you ever submit an INC bid that you were incapable of performing if called on by the ISO to perform?
>
> **RESPONSE**: To the best of Powerex's knowledge, Powerex is not aware of any instance in which Powerex submitted an INC bid that Powerex believed Powerex could not perform if called on by the ISO.[29]

In response to the same question on decremental bids, Powerex provided an evasive answer.

> **CAL-PWX-72**. List all DEC bids that you submitted at an intertie that exceeded the ISO's export capacity at that intertie.
>
> **RESPONSE**: Powerex cannot provide such a list because Powerex did not have sufficient information at the time that it bid to determine the ISO's real time rating of the interties, which generally depends on factors including, but not limited to, derating, ratings, counterflows, and Existing Transmission Contract usage.[30]

Q. What do you conclude about this aberrant bidding behavior?

A. Powerex wielded enormous market power in the ISO real-time market. The fact that they submitted bids of this magnitude illustrates the magnitude of their market power. This particular event appears to be an attempt to not only influence the real-time price, but to ensure, through the submission of enormous

[29] Exh. No. CA-193 at 14.
[30] Exh. No. CA-193 at 9.

bids, that Powerex would receive the lion's share of benefit from being the largest importer into the ISO's real-time market.[31]

E. July, August, and September 2000

Q. Did Powerex submit bid price spikes into the real time market in July, 2002?

A. In July, Powerex submitted bid price spikes on July 7-8, July 10, July 15, July 16, July 17, July 18, July 26, July 26-27, July 29-30, and July 31 (ISO declared emergency). During these episodes, Powerex increased the bid prices on <u>all or a large number</u> of units (i.e., import IDs) that were bid into the real time market.

Q. Please describe Powerex's bidding behavior in the ISO real time market during August, 2000.

A. After the $250 price cap was put in place on August 7, there were no pronounced spikes in bid prices. However, on August 10-11, there was a repeat of the incident that took place on May 22, 2000. During that emergency, Powerex dramatically reduced the quantity of MWs offered into the ISO real time market. August 11 was also a day of an ISO declared emergency. The timing of this event is slightly different. Powerex withdrew the supply offers in the day and the hours preceding the emergency (as opposed to during the actual emergency). This could have been an attempt to push the ISO into the emergency. After the emergency was declared, Powerex increased the MWs offered to levels seen during peak hours on the days preceding and following Aug. 10-11. Figure 78

[31] Exh. CA-54 contains an internal Sempra e-mail dated October 19, 2000 that discusses Powerex bidding behavior. The e-mail is significant in two respects. First, Sempra appears to have very detailed information about Powerex's bids that was obtained from Mckenzie at the "beep desk". This raises serious questions about the confidentiality of bid data. Second, Sempra decides to counter Powerex's bidding strategy with what appear to be a number of fictitious bids of its own.

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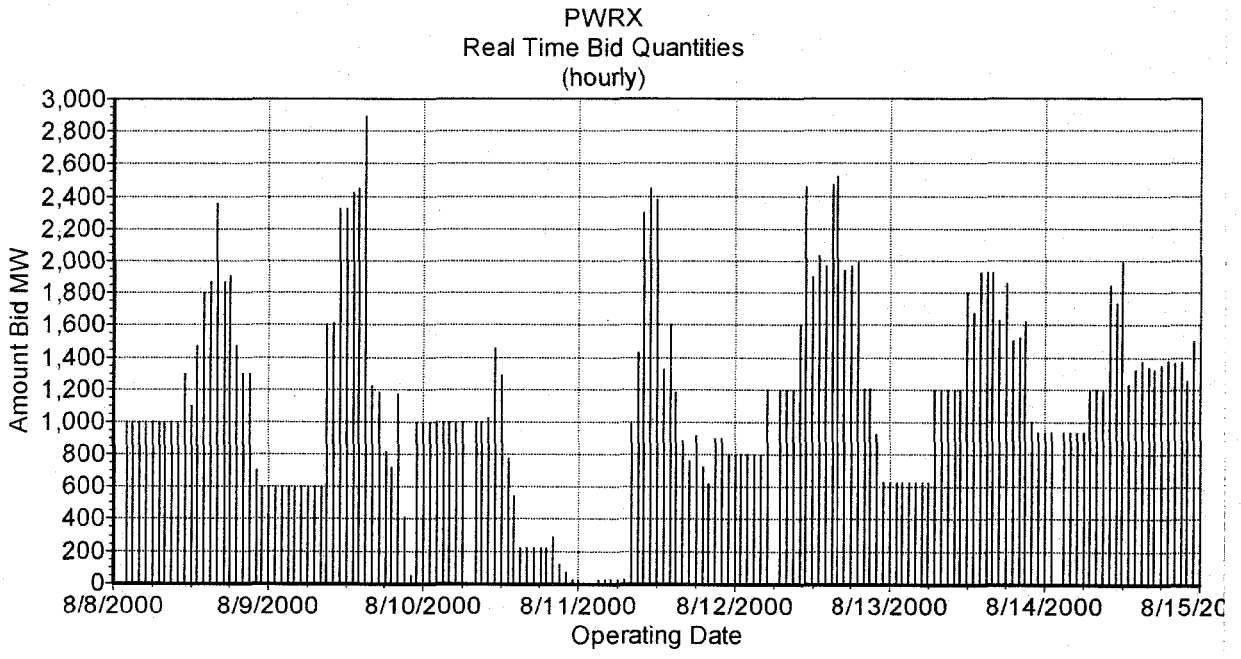
shows the hourly quantities offered by Powerex into the ISO real time market on August 10-11, 2000.

Figure 78



Q. Are there any more instances of Powerex withdrawing significant amounts of supply offers from the ISO real time market?

A. Yes. In September 2000, during five days at the end of the month, Powerex dramatically reduced the MWhs that it offered into the real time market during peak hours. Typically, Powerex bid approximately 2000 MWhs into the real time market during peak hours. During September 23, 24, 26, 27, and 28, Powerex bid closer to 400 MWs. Such a drop in real time supply offers—an 80% drop—can only adversely affect real time operations. Figure 79 shows the hourly MWs bid into the real time market by Powerex in the month of September. Especially significant are the amounts typically offered on peak, and the dramatic decline in amounts offered at the end of the month.

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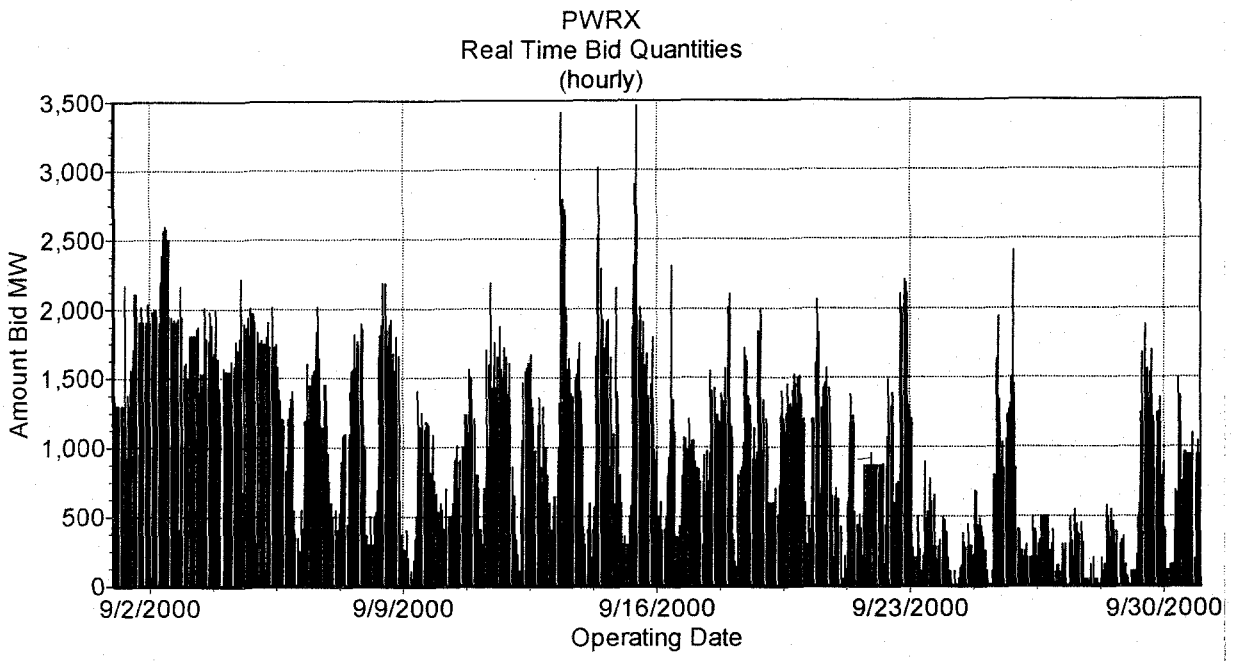
Figure 79



Q. What do you conclude from this pattern of bidding behavior?

A. I conclude that Powerex wielded enormous market power in California with the ability to swing the real time supply curve by 1500 or 2000 MW in any given hour. E-mails provided by Powerex in discovery reveal that Powerex supplied large segments of the ISO real time market.[32] The evidence shows that Powerex exercised this market power on a number of occasions. As stated by a Powerex

[32]Powerex was well aware that it had a large share of the ISO real time market. An e-mail from Jeff Lam to Douglas Little states, "Doug, here's a draft copy of the California Market Analysis. It shows that we are a small player in the day ahead market (1% by volume) but a substantial player in the real time and A/S markets (30% by volume) for the months of April to August 2000. If you take the month of June, Powerex's energy accounted for 44% of the ISO's real time purchases. The ISO's real time costs for June was $330 M. Powerex revenues for the same period was $ 99 M or 30% of the ISO's real time costs." Exh. No. CA-189 at 1. Another e-mail states, "Doug, I've updated the analysis of Powerex's market share of the CALISO's real time market up to November 2000. The most significant item is the November results where our real time sales were 656,234 MWh or 79% of the CALISO's net real time requirements of 827,997 MWH. This translates to over $148 M in sales revenue." Exh. No. CA-189 at 2.

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trader in a conversation with another trader, "Save it for real time baby. That's were it's at." Exh. No. CA-155.

F. October through December 2000

Q. Please describe Powerex's bidding behavior after September 2000.

A. In the last three months of 2000, Powerex's bids typical quantities and prices up to the then-prevailing $250 cap until December 6, 2000. On that date, Powerex suddenly curtailed all supply offers into the ISO real time market. Powerex re-entered the market on December 12, after the soft cap was implemented. Powerex bid prices on and after December 12 increased by $500 to an average of approximately $750, with a number of bids being submitted over $1100. On December 20, Powerex exited the ISO real time market again, only to return in the first three days in January with very small amounts of MWs. Powerex exited the ISO real time market for good on January 3, 2001. Figure 80 shows Powerex's hourly bid prices in the last three months of 2000.

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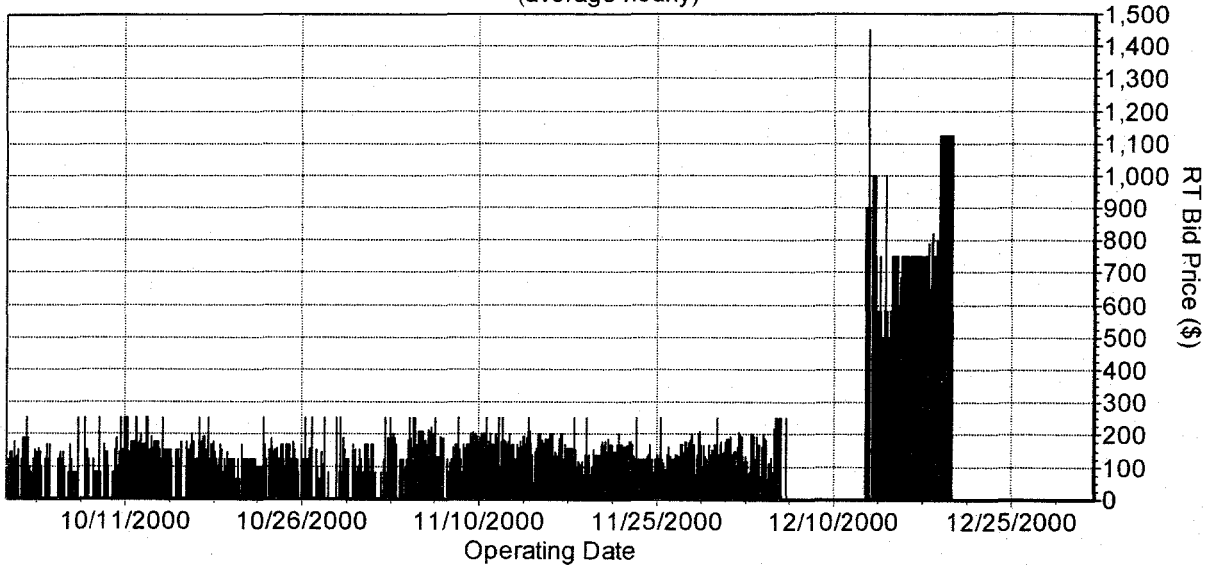
Figure 80



Q. Did Powerex stop selling power to California in December, 2000 and January, 2001?

A. Although Powerex's participation in the real time market fell off sharply in December, Powerex continued to make sales to the ISO through other mechanisms. In lieu of bidding into the real time market, Powerex made numerous Out of Market (OOM) sales to the ISO. These OOM sales were made through negotiated bilateral agreements on a daily and multi-day basis principally in November and December. Additionally, Powerex sold energy to the ISO through intermediaries in order to reduce credit exposure to the ISO (and ultimately to reduce refund exposure). Finally, Powerex entered into energy exchange transactions whereby the ISO agreed to pay for energy received from Powerex by returning energy itself, but in larger proportions. After CERS starting purchasing on behalf of the ISO in January, Powerex executed transactions with that agency, and did not make sales directly to the ISO.

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1 **G. Investigations into Powerex Bidding Behavior**

2 Q. Did the ISO ever find evidence that Powerex manipulated the real time market?

3 A. Yes. Prior to April 4, 2000, Powerex was found by the ISO to have manipulated
4 the Target Price. This manipulation resulted in increased real time prices.

5 Q. What is the Target Price?

6 A. The need for a Target Price occurs when the highest decremental bid submitted
7 into the real time market is greater than the lowest incremental bid. When this
8 occurs, the ISO must apply an adjustment to the bid prices to ensure that the
9 highest decremental bid is less than or equal to the lowest incremental bid. The
10 target price methodology achieves this desired result. The Target Price
11 methodology and changes to that methodology are explained in "Attachment C:
12 ISO Paper Circulated to Market Participants Summarizing Modifications Made
13 to ISO's Methodology for Calculating the Target Price for Real Time Energy
14 Due to Gaming of Target Price Protocols" and "ISO Target Price: Problems with
15 the New Methodology" Exh. No. CAL-62 at 30-35.

16 Q. Did the ISO document this manipulation by Powerex?

17 A. As part of the discovery process, the California Parties obtained a report from
18 the ISO's Department of Market Analysis entitled "Attachment A: Evidence of
19 the Potential Manipulation of the ISO's Target Price for Real Time Energy by
20 Powerex" dated 12/4/2002, and "Attachment B: Additional Examples of
21 Potential Manipulation of the ISO's Target Price for Real Time Energy by
22 Powerex". Exh. No. CA-62 at 2-29. These documents detail how Powerex
23 manipulated the Target price prior to April 4, 2000. The report concludes that
24 Powerex manipulated the Target price in 88 hours between January 11 and April

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1 4, 2000. The manipulation resulted in estimated additional revenues to Powerex
2 of $289,000 with total additional payments by buyers of instructed and
3 uninstructed energy estimated at $1.46 million.

4 Q. Was Powerex aware that its bidding behavior caused an increase in market
5 prices?

6 A. An e-mail from Tom Bechard dated 2/19/2000, states, "...the increase in over
7 generation began after we started putting in high priced buy bids in the sup
8 market to protect our price taker sales. It may be that this has skewed the entire
9 supp market up in price and resulted in generators underscheduling in the day
10 ahead and hour ahead market so they can over generate to over take the BEEP."
11 Exh. No. CA-36.

12 Q. What does "protect our price taker sales" mean in the Bechard e-mail quoted
13 above?

14 A. Placing high priced <u>buy</u> bids into the real time market will keep the market
15 clearing price high even when the ISO decrements energy in the real time
16 market. Prior to April 4, 2000 high priced decremental bids also caused an
17 increase in the real time price through the Target Price methodology. Since
18 Powerex frequently over generated and dumped power into the real time market
19 as a result of its Fat Boy strategy (scheduling generation against fictitious load),
20 it could "protect" the price that it received for these "price taker" sales by
21 submitting high priced decremental bids. The Fat Boy strategy and its effect on
22 the California markets is discussed in more detail in Dr. Fox-Penner's testimony.
23 *See* Exh. No. CA-1.

24 Q. Did manipulation of the Target Price continue after the ISO revised the
25 methodology it used to set the Target Price on April 4, 2000?

1 A. Yes. After April 4, 2000, sellers continued to manipulate the target price. Notes
2 from a Portland General Electric trader on June 7, 2000 indicate as much,
3 "Target Price Methods – no change since last big ch. (games still work)" Exh.
4 No. CA-226 at 4-5.

5 Q. Did the CALPX ever find evidence of market manipulation by Powerex?

6 A. In March of 2000, the CALPX investigated an event that took place in the ISO
7 congestion management market on Oct. 15, 1999. In hour 3, Powerex submitted
8 a $600 bid that was selected by the ISO and caused the price at NW3 to clear at
9 $600. When asked to explain the reason for the bid, Renata Kurschner of
10 Powerex explained that, "...Powerex was trying to send a signal to another
11 participant to stop a certain action they were taking." Exh. No. CA-156 at 2.

12 Q. What did the CALPX conclude after its investigation of this event?

13 A. The CALPX decided to drop further action. The CALPX determined the
14 Powerex did not violate any CALPX rules and that Powerex had not obtained
15 any confidential information that was a basis for its "signaling". In addition, no
16 complaints had been filed.

17 Q. What are your conclusions regarding this event?

18 A. Powerex attempted to send a signal through its bids and was successful. As
19 stated in the memo from Karl Marlantes to David Jermain, "Powerex stated that
20 they noticed that there was a change in adjustment bidding by other Participants
21 after the event." Exh. No. CA-156 at 7. This is another example of Powerex's

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ability to affect prices and behavior in the California markets. It is another example of Powerex's ability to exercise market power.[33]

XI. IMPORTERS: LADWP (LDWP)

A. General Trends

Q. Please describe LADWP's participation in the ISO real time market during the January 2000 to June 2001 period.

A. LADWP was active in the ISO real time market throughout 2000. After January 2001, it ceased this participation and commenced making sales to CERS.[34] Figure 81 shows the quantity of MWhs bid into the real time market by LADWP in each month from January 2000 to June 2001. Notably, in September the quantity fell to a third of what was offered in August. These amounts remained low until December when it doubled after the implementation of the soft cap, but fell again during the last month of participation in January.

[33] Exh. CA-37 contains an internal Powerex e-mail that explains further Powerex's behavior on October 15, 1999.

[34] LADWP was one of the largest sellers to CERS during the January 17, 2001 to June 20, 2001 period. *See* Exh. No. CA-14 (Appendix A).

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Figure 81
LADWP
Total MWhs Bid into Real Time Market

Month	MWh
Jan-00	145,011
Feb-00	151,598
Mar-00	148,119
Apr-00	123,494
May-00	156,543
Jun-00	169,514
Jul-00	196,924
Aug-00	194,292
Sep-00	63,658
Oct-00	77,301
Nov-00	73,567
Dec-00	144,833
Jan-01	76,052
Feb-01	0
Mar-01	0
Apr-01	0
May-01	0
Jun-01	0

B. January through April 2000

Q. Please describe the bidding behavior of LADWP during the first four months of 2000.

A. Like Powerex, LADWP's bids into the real time market were quite variable during the January 2000-April 2000 period. For the most part, however, average bid prices were well under $100/MW. Figure 82 shows average bid prices for each hour from January 1, 2000 – April 30, 2000 for LADWP.

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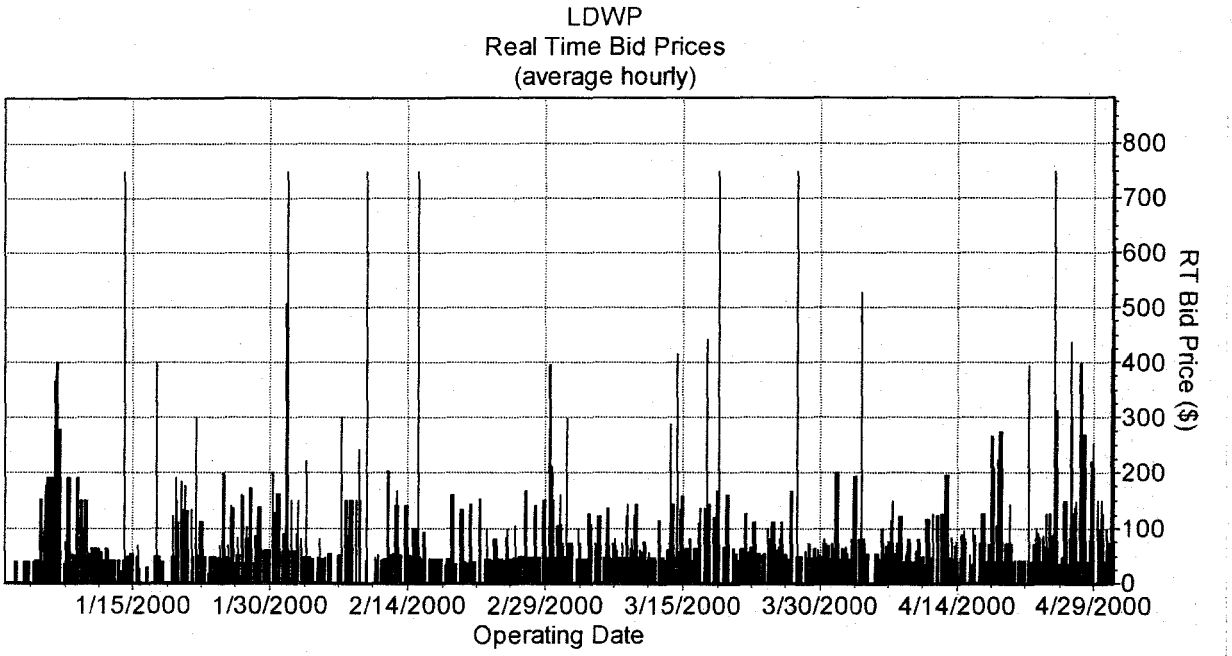
Figure 82



C. May 2000

Q. Please describe LADWP's bidding behavior in the ISO real time market during May 2000?

A. In May, LADWP submitted pronounced bid price spikes on May 21, May 22, May 29, and May 31, and some smaller spikes during the first days of the month May 2-7. During these episodes, LADWP increased the bid prices on <u>all or a large number</u> of units (i.e., import IDs) that were bid into the real time market.

Q. Did you look more closely at LADWP's bidding behavior during the ISO declared emergency on May 22, 2000?

A. Yes. On May 21, the day preceding the emergency, LADWP spiked all bids into the real time market. Then, on May 22, LADWP bid nothing into the real time

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market for the hours preceding, and for several hours during the emergency. Following the emergency, on May 23-24, LADWP's bid prices dropped down to the $200/MW and LADWP spiked the *quantity* that it bid into the real time market (of course the emergency was over by then).

Q. What conclusions do you draw from LADWP's biding behavior during the ISO-declared emergency on May 22, 2000?

A. I conclude that *these bidding patterns were not consistent with competitive behavior. They are consistent with a strategy to withhold supply and to increase market prices.* LADWP hourly bid prices and bid quantities for May are illustrated in Figures 83 and 84, respectively.

Figure 83

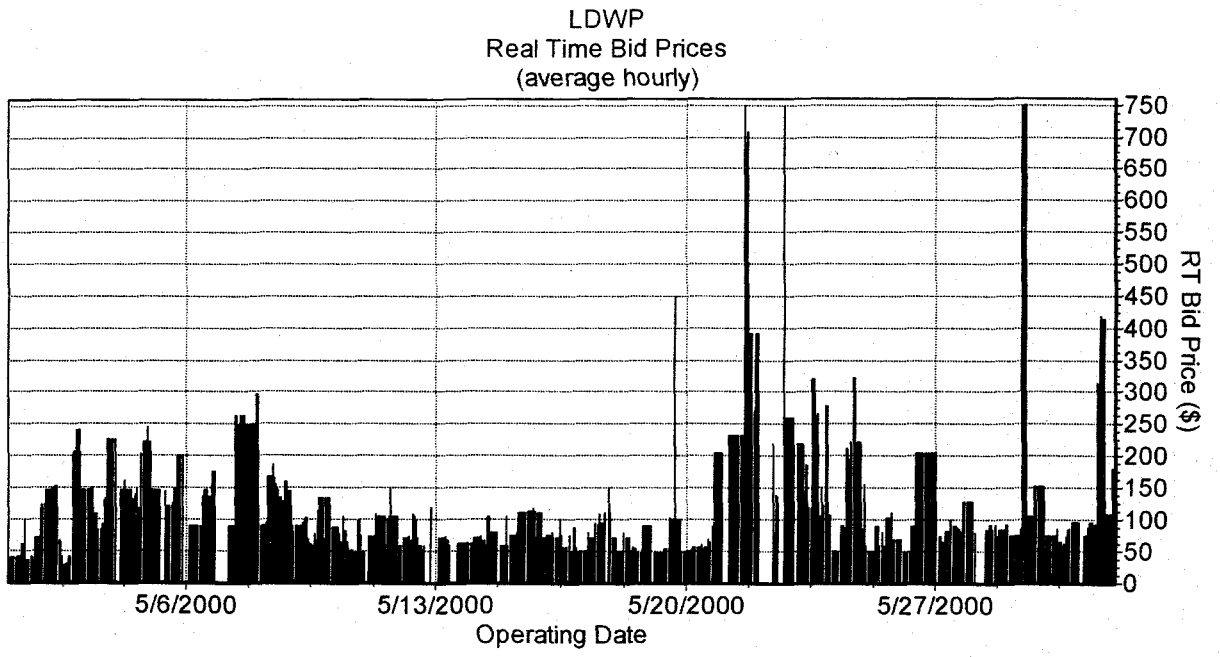

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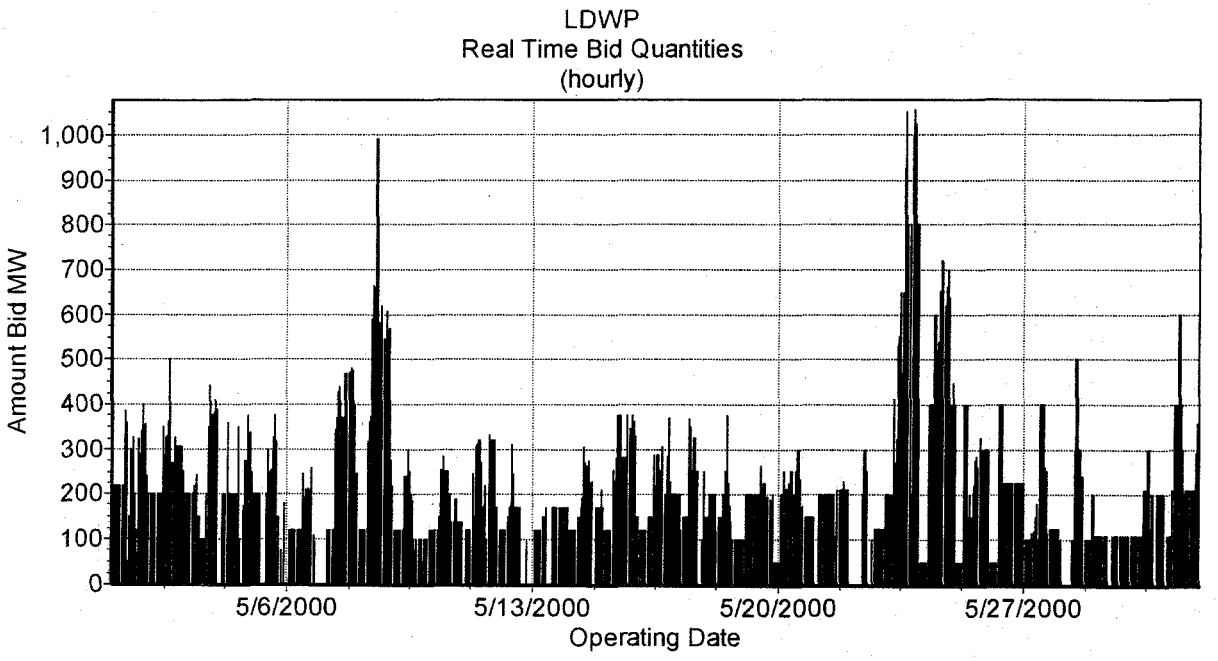
Figure 84



D. June and July 2000

Q. Please describe the bidding behavior of LADWP in June and July 2000.

A. In June and July, these same bidding patterns continue—removing supply from the real time market for small periods, and spiking the bid prices on all or a large number of units (i.e., import IDs) for small periods. These are the same anti-competitive bidding strategies used by Dynegy, Mirant, and Reliant. In June, LADWP submitted bid price spikes on June 1, June 14 (ISO declared emergency), June 27 (ISO declared emergency), June 28 (ISO declared emergency), and June 29 (ISO declared emergency). LADWP withdrew bids from the ISO real time market for periods on June 14-15, June 18-19, June 27, June 28, June 29, and June 30. This can be seen in Figure 85.

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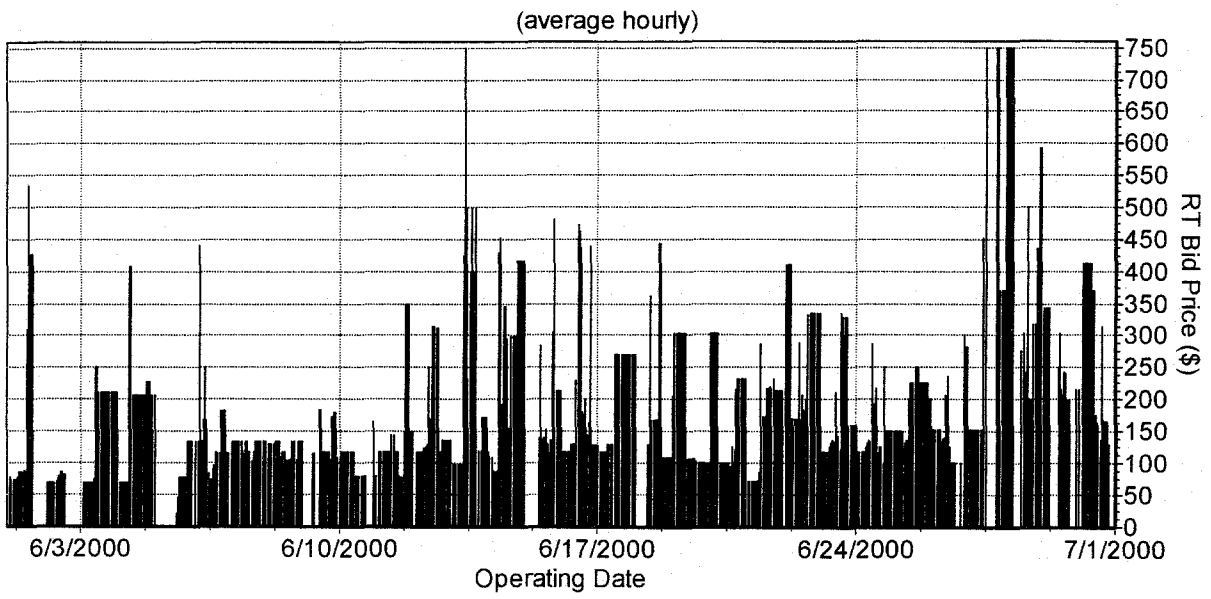
Figure 85



Q. Please describe the bid price spikes that characterize LADWP's bidding activity into the real time market during July, 2000.

A. In July, the most prominent bid price spikes submitted by LADWP into the real time market occurred on July 2, July 24 (ISO declared emergency), July 25 (ISO declared emergency), and July 27.

E. September 2000

Q. Please describe the bidding behavior of LADWP in the real time market in September, 2000.

A. As noted above, the quantity that LADWP offered into the real time market in September fell to one third the level offered in August. This can be seen in Figure 86 which shows hourly quantities offered by LADWP into the real time market in September. Figure 87 shows detail of MWhs bid from Sept 11-21.

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During ISO-declared emergencies on September 12, 13, 14, 16, 18, 19, and 20, 2000, LADWP offered little energy into the ISO real time market. Significantly, LADWP offered no MWhs whatsoever into the market on September 16, an ISO emergency day.

Figure 86

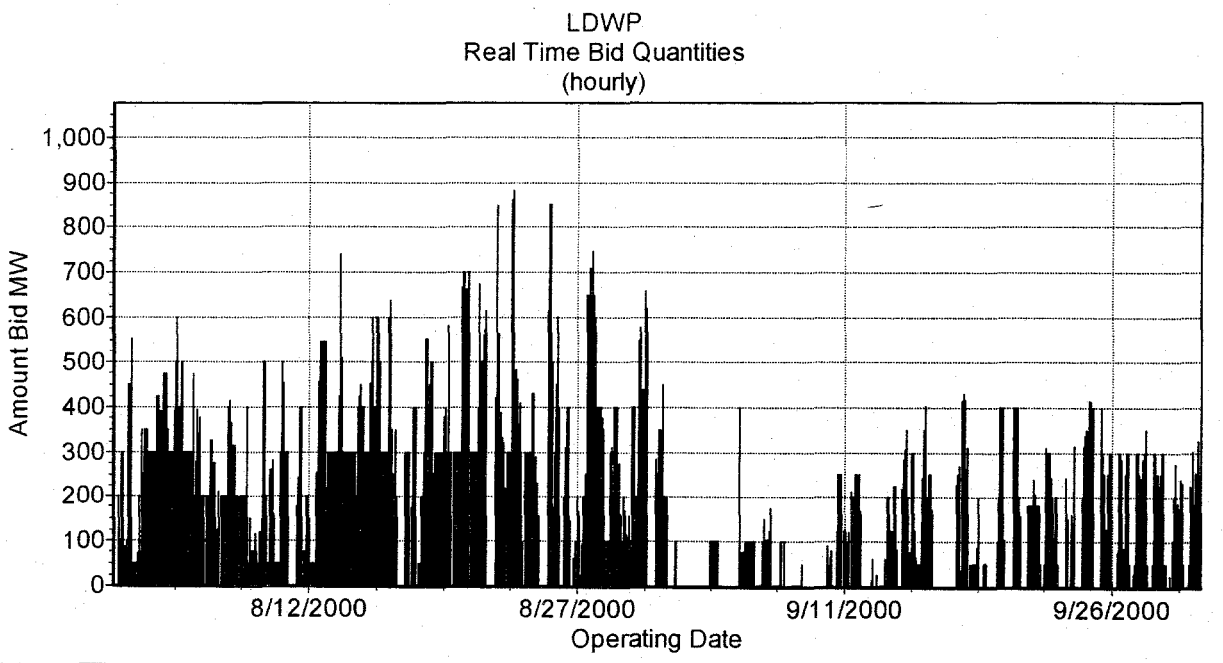

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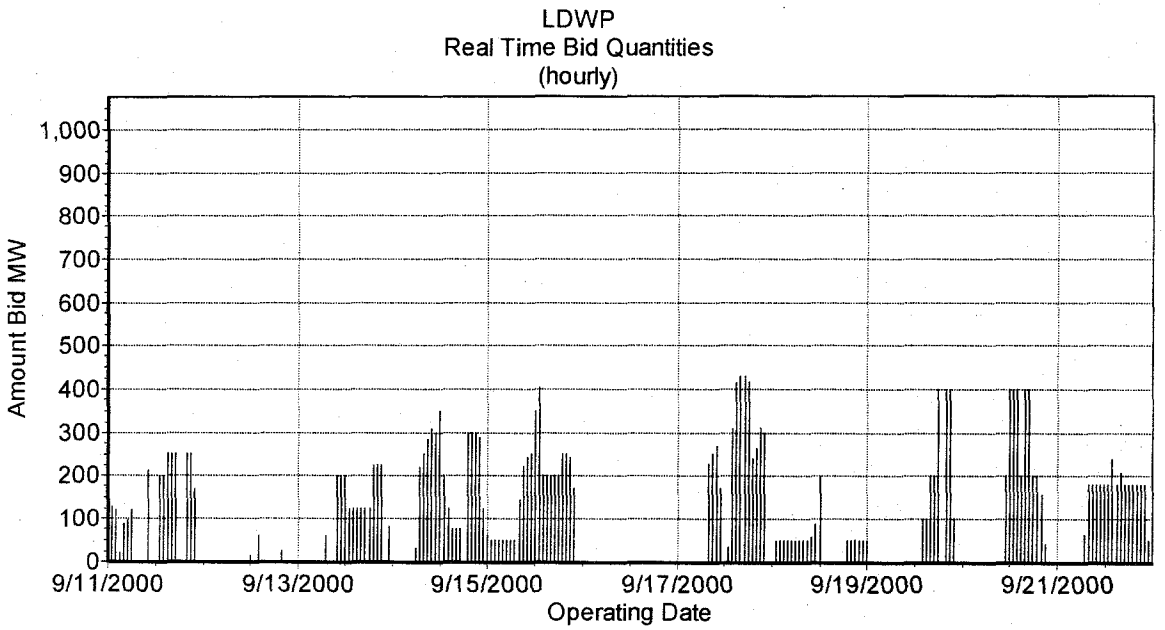
Figure 87



F. October 2000 through January 2001

Q. Please describe LADWP's bidding behavior into the real time market after September 2000.

A. For the remaining months that LADWP participated in the ISO real time market, there were continued patterns of withdrawing supply offers during short periods of time. In December, LADWP offered nothing into the real time market from December 7-9. From December 10-14, LADWP's bid prices ranged from $700/MW to over $800/MW. Figure 88 illustrates LADWP's hourly bid prices from October 2000 though the end of LADWP's participation in the real time market in January 2001.

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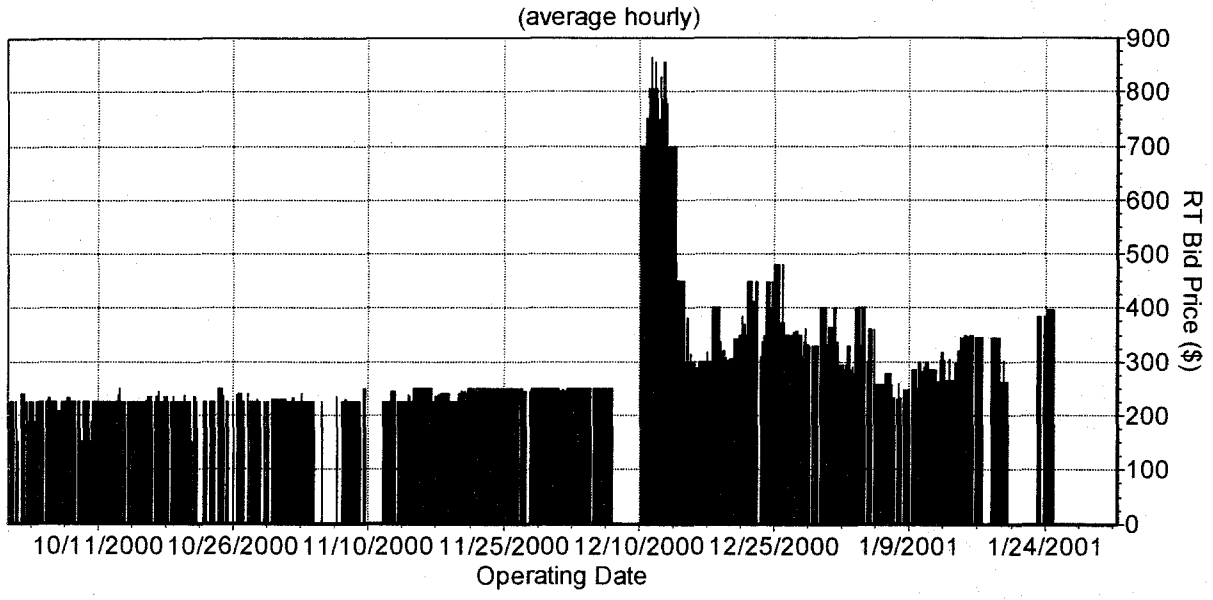
Figure 88



XII. IMPORTERS: IDAHO POWER COMPANY (IPC)

Q. Please describe Idaho Power's participation in the ISO real time market during the January 2000 to June 2001 period.

A. Idaho Power was active in the ISO real time market throughout 2000. After December 2000, it ceased this participation. Figure 89 shows the quantity of MWhs bid into the real time market by Idaho Power in each month from January 2000 to June 2001.

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Figure 89
IDAHO POWER
Total MWhs Bid into Real Time Market

Month	MWh
Jan-00	49,128
Feb-00	58,289
Mar-00	64,986
Apr-00	47,838
May-00	47,522
Jun-00	57,715
Jul-00	47,083
Aug-00	57,394
Sep-00	34,696
Oct-00	56,160
Nov-00	37,565
Dec-00	10,560
Jan-01	0
Feb-01	0
Mar-01	0
Apr-01	0
May-01	0
Jun-01	0

Q. Did Idaho Power's bidding behavior resemble that of other sellers?

A. For the most part, the bidding strategies of Idaho Power resembled those of LADWP, Powerex, and several in-state generators. Idaho Power spiked the bids on all or a large number of units (i.e. import IDs) during the months of May, June, and July. From August through November, Idaho Power frequently bid in at the cap, and withdrew bids for short periods. The bid spikes, and the "no bid" periods, were not random. They typically occurred during times of emergencies.

Q. During what days did Idaho Power submit bid price spikes into the ISO real time market?

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A. During May-July, Idaho Power submitted bid price spikes on all or a large number of units (i.e., import IDs) that were bid into the real time market on numerous days. These days were:

May: May 10, May 20, May 22 (ISO declared emergency), and May 26

June: June 2, June 6, June 14 (ISO declared emergency), June 15, June 18, June 21, June 24, June 26 (ISO declared emergency), June 27 (ISO declared emergency), June 28 (ISO declared emergency), June 29 (ISO declared emergency), and June 30

July: July 7, July 12, July 19 (ISO declared emergency), July 26, July 29, July 30, and July 31 (ISO declared emergency)

Q. Do you have an illustration of these bid price spikes?

A. These bid price spikes by Idaho Power are illustrated in Figures 90 and 91. Figure 90 shows average hourly bid prices in May. Figure 91 shows average hourly bid prices in June and July.

Figure 90

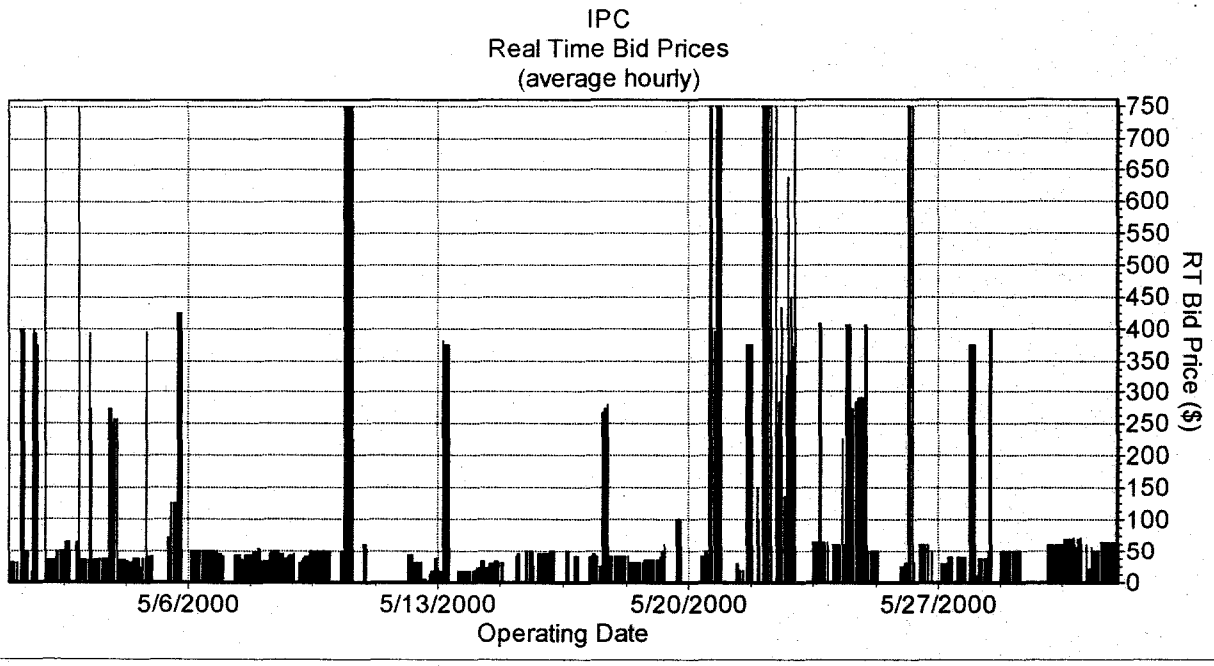

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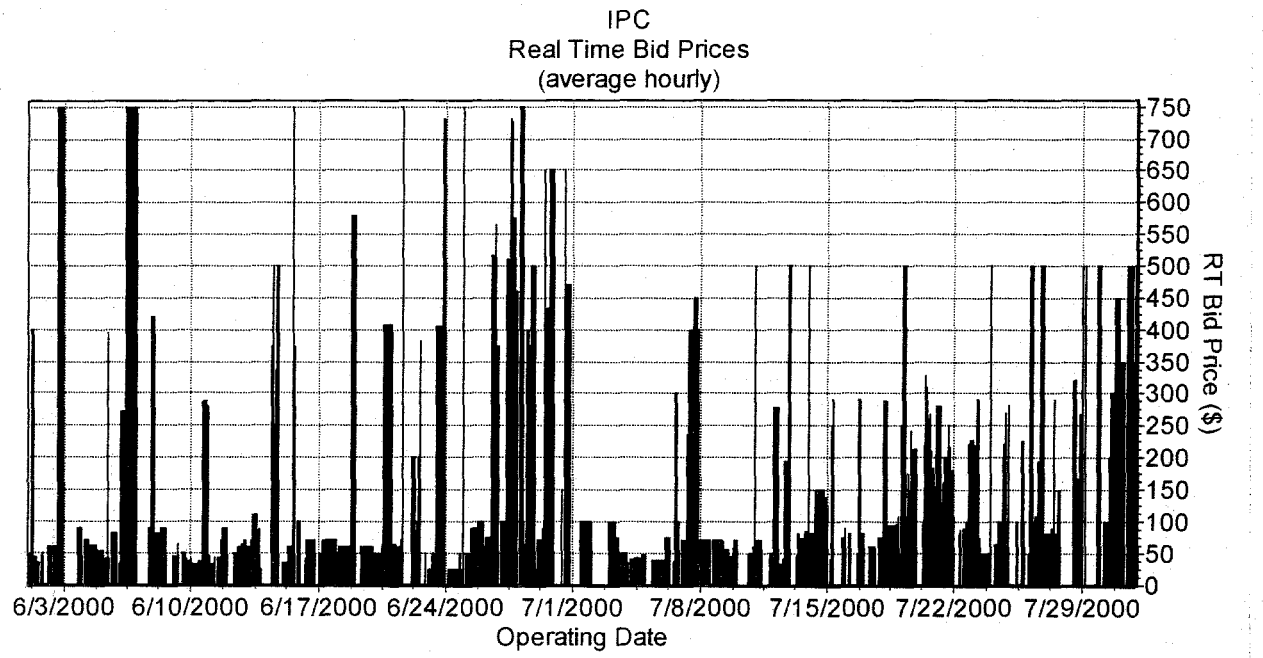
Figure 91



Q. Please describe the bidding behavior of Idaho Power in December 2000 during the periods before and after the implementation of the $250 soft cap.

A. Idaho Power did not submit any bids into the real time market from December 6, 2000 through December 12, 2000. For the following three days, December 12-14, Idaho Power's average hourly bid price shot up to $2000. After the $2000 episode, Idaho Power exited the real time market. Idaho Power's hourly bid prices in the month of December 2000 are illustrated in Figure 92.

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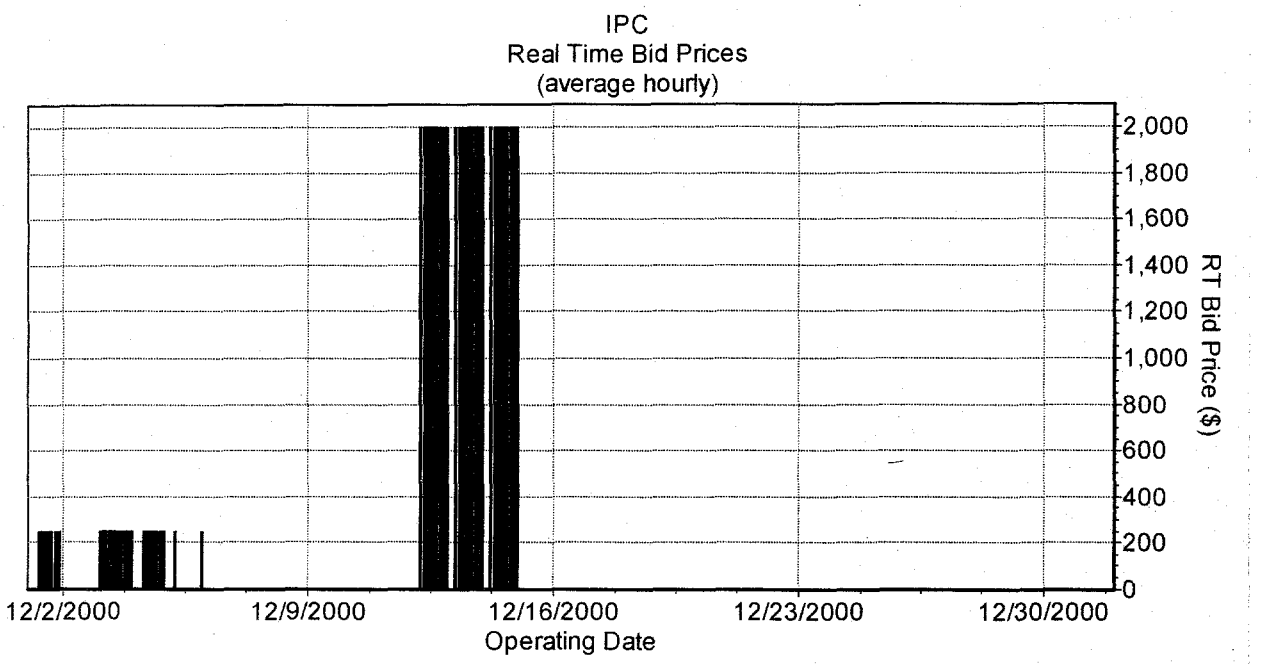
Figure 92



XIII. IMPORTERS: BPA (BPA1)

Q. Please describe BPA's participation in the ISO real time market during the January 2000 to June 2001 period.

A. BPA was most active in the ISO real time market from January 2000 through the summer of 2000. BPA's participation dropped off sharply in October, only to drop further in December 2000 and January 2001. After January 2001, BPA ceased this participation. In the fall of 2000, BPA started selling energy to the ISO through other arrangements such as energy exchange transactions and OOM sales. After January 2001, BPA commence making sales to CERS.[35] Figure 93

[35] BPA was among the top 10 sellers by volume to CERS during the January 1, 2001 to June 20, 2001 period. *See* Exh. No. CA-14 (Appendix A).

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shows the quantity of MWs bid into the real time market by BPA in each month from January 2000 to June 2001.

Figure 93
BPA
Total MWhs Bid into Real Time Market

Month	MWh
Jan-00	241,326
Feb-00	280,874
Mar-00	378,462
Apr-00	289,335
May-00	237,217
Jun-00	157,847
Jul-00	287,886
Aug-00	319,756
Sep-00	177,150
Oct-00	30,730
Nov-00	27,000
Dec-00	15,672
Jan-01	17,050
Feb-01	0
Mar-01	0
Apr-01	0
May-01	0
Jun-01	0

Q. Please describe BPA's bid price behavior during this period.

A. Figure 94 shows the bidding behavior of BPA during the whole period, January 2000 – January 2001. Starting the day after the May 22 emergency, BPA submitted bids at the $750, $500, and $250 price cap levels during the various price cap periods. The drop off in participation after September 2000 is clearly visible.

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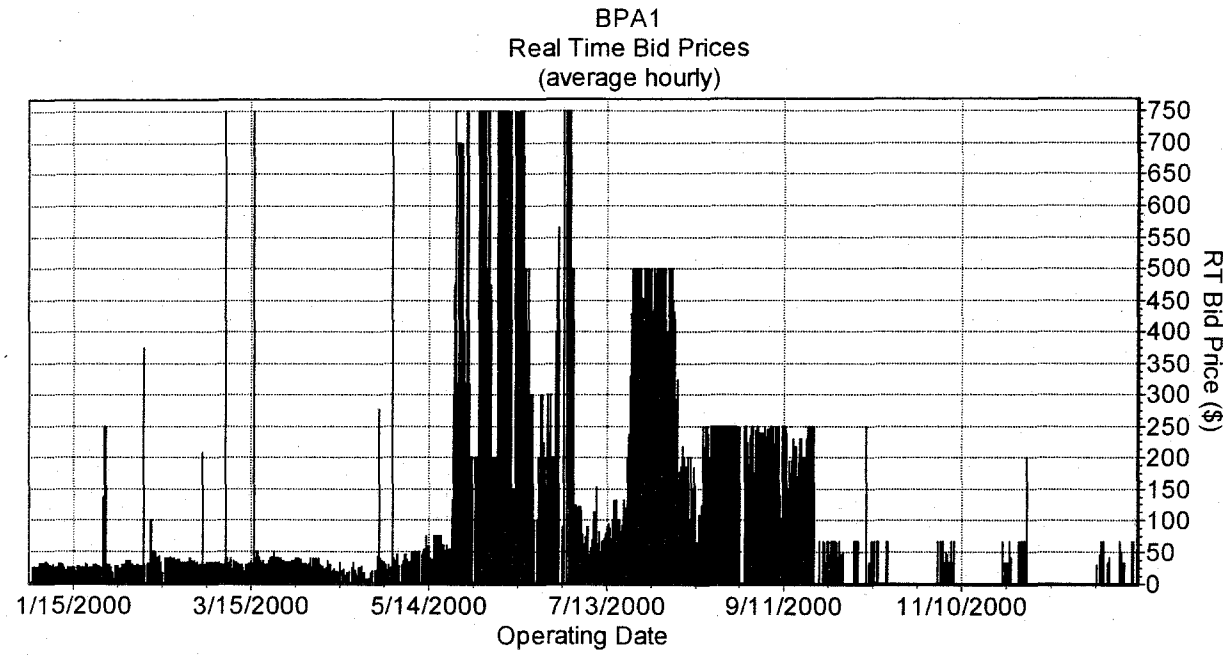
Figure 94



Q. Did BPA submit bid price spikes into the real time market at any time during this period?

A. Yes. BPA primarily submitted bid price spikes into the real time market during May and June. Bid price spikes were submitted on May 23, May 24, May 25, May 27, May 31, June 1, June 2, June 3, June 28 (ISO declared emergency), June 29 (ISO declared emergency), June 30, and July 1. There was elevated bidding from June 6 through June 14. Figure 95 shows the hourly bid prices for BPA during the period May 20-July 3.

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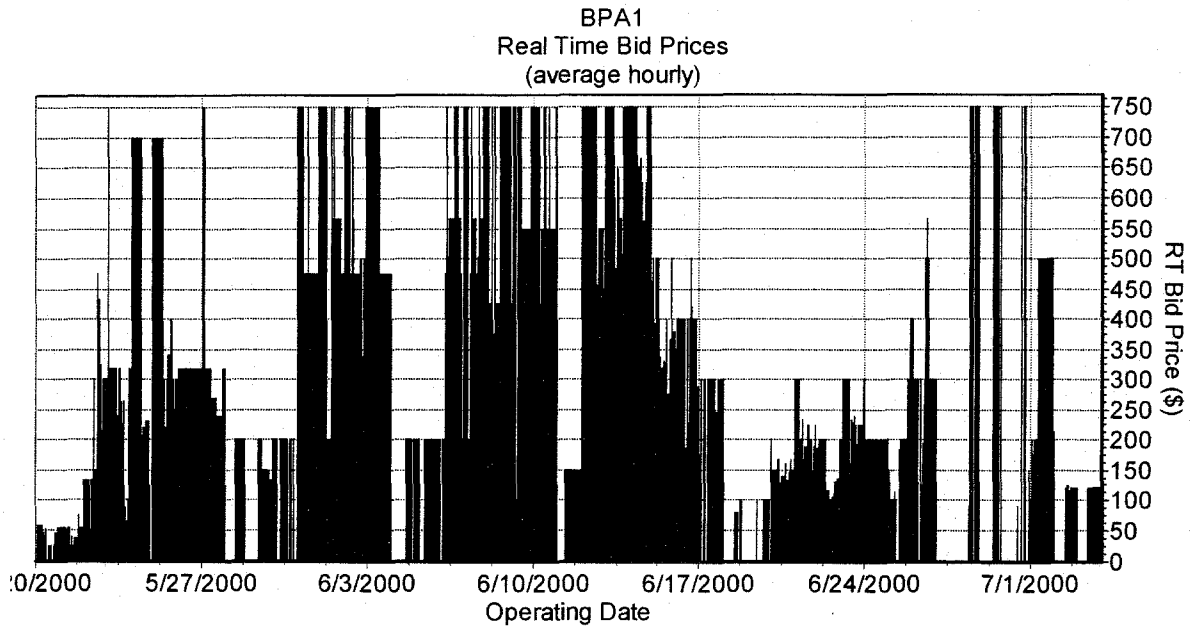
Figure 95



XIV. ENERGY EXCHANGE TRANSACTIONS

Q. Earlier in your testimony you referred to the fact that BPA and Powerex were active in the ISO real-time market throughout much of the year 2000, but that both dropped their participation towards the end of 2000 and began selling energy to the ISO through other arrangements, such as energy exchange transactions, or to CERS, through bilateral sales or energy exchanges. Please explain what you mean by an energy exchange.

A. In an energy exchange, one party provides energy in a certain period and agrees to receive energy at a later date. The amount of the energy returned is equal to the amount of energy obtained, multiplied by a "return ratio" typically greater than one. As I stated earlier, both BPA and Powerex, among others, were involved in substantial exchange transactions with both the ISO and CERS.

1 Q. Has the issue of energy exchanges between sellers and the ISO and CERS been
2 addressed in other proceedings?

3 A. Yes. The California Parties filed testimony in the Refund Proceeding relating to
4 ISO exchanges. The testimony was stricken because the Presiding Judge
5 concluded that the Commission did not explicitly order that exchanges should be
6 mitigated. In *Puget Sound Energy, Inc.*, Docket Nos. EL01-10-000, et al., certain
7 California state parties provided testimony concerning CERS exchange
8 transactions with BPA and Powerex, but the Presiding Judge in that case decided
9 that none of CERS' purchases or exchanges with sellers in the Pacific Northwest
10 were appropriate for consideration in that docket, because they were not purchases
11 or exchanges "into" the Pacific Northwest. The Commission has not yet acted in
12 those proceedings.

13 Q. Why did the ISO and CERS engage in energy exchange transactions?

14 A. One reason was that sellers viewed the ISO as a credit risk and therefore would
15 not sell additional energy to the ISO through monetary transactions. Energy
16 exchange was a vehicle through which the ISO could obtain additional energy
17 from sellers who would not bear increased credit risk. A seller who sold to the
18 ISO through an exchange transaction would receive its payment in energy and
19 would not have to wait for cash to flow through the ISO markets. Also, since
20 energy prices were extremely volatile, the seller could reduce price risk on future
21 energy purchases if the payment was made in energy. Additionally, sellers may
22 have been hoping to avoid refund liability by making sales in-kind rather than for
23 explicit monetary payment. For CERS, sellers similarly had an incentive to
24 attempt to avoid refund liability by making sales in-kind to a non-ISO entity.

25 Q. Why should energy exchange transactions be subject to mitigation?

1 A. There is always an implicit price per MWh for energy that is obtained through an
2 exchange transaction based on the return ratio, since the ISO or CERS must buy
3 energy at the market price in order to return the energy owed to the original seller.
4 During the Refund Period, market prices were manipulated and return ratios were
5 excessively high. Together these two facts raised the costs of energy exchanges
6 to exorbitant levels—thus they require appropriate mitigation.

7 Powerex, one of the primary parties engaged in exchanges with the ISO and
8 CERS, acknowledged this to be the case in internal e-mail exchanges. In one such
9 exchange, a Powerex trader bemoans the fact that BPA is portrayed as the "good
10 guy" and Powerex is portrayed as the "bad guy" on sales and exchanges with
11 CERS, even though both Powerex and BPA were profiting handsomely, at above-
12 market levels, on the transactions. As the Powerex trader put it "There is another
13 story in the headlines that quotes CDWR public relations guy as saying we are
14 charging double the market at times" He goes on to say that this allegation of
15 charging double the market is "not untrue" but "is confidential" and "quite
16 negative" in the context of the article. "BPA is getting a sweet deal and being
17 praised for it." The May 30, 2001 news story that he refers to, included within the
18 e-mail, involves an ISO exchange with BPA with a 2-to-1 ratio that greatly
19 benefited BPA. Exh. No. CA-44.

20 Q. Why did the ISO and CERS enter into energy exchange transactions that were so
21 costly?

22 A. In most cases, this was the only way that the ISO or CERS could obtain additional
23 energy. In December 2000, BPA stated that it would not sell additional energy to
24 the ISO except through energy exchanges at a ratio of at least 2-to-1. BPA and
25 Powerex were among the largest suppliers to the ISO and CERS. The ISO and
26 CERS bought this excessively priced energy because they had no other choice.

1 Q. You stated that exchange transactions should be mitigated because they were
2 excessively priced and because the prices themselves were manipulated. But
3 aren't energy exchanges distinct from other sales that are subject to mitigation?

4 A. No. Energy exchange transactions involve purchases and sales of energy. They
5 should not be distinguished from any other sort of purchase such as an OOM or
6 day-ahead purchase simply because of the form of payment. Energy exchange
7 purchases are paid for in energy or indirectly in dollars as opposed to directly in
8 dollars. The Commission does not distinguish the form of payment for energy
9 sales. The Commission views energy exchange transactions as another type of
10 sale subject to its jurisdiction. See Power Notice and Filing Requirements Under
11 Part II of the Federal Power Act, 64 FERC ¶ 61,139 at 61,992 granting in part and
12 denying in part Motions for Clarification and Rehearing, 65 FERC ¶ 61,081 at
13 61,507 (1993) ("[a]n exchange of electric energy . . . amounts to a wholesale sale
14 for payment in kind"). "Electric service," which the Commission defines at
15 section 35.2(a) of its regulations (18 C.F.R. § 35.2(a)(2001)) as either transmission
16 or wholesale sales of electric energy, expressly encompasses exchange
17 transactions "without regard to the form of payment or compensation for the sales
18 . . . lender. . . ." Sellers that have circumvented conventional pricing mechanisms
19 should not be exempted from the refund obligation. Energy exchanges are no
20 different from any other sort of mitigated purchase made by the ISO, and thus
21 should be treated in the same way. Likewise, CERS exchanges represent energy
22 acquired by CERS to meet the needs of the ISO. All of these transactions
23 occurred during the Refund Period, from October 2, 2000 through June 20, 2001.
24 Accordingly, the Commission should apply price mitigation to them.

25 Q. Has the Commission ever ordered refunds in cases that involve energy exchanges
26 or in-kind transactions?

A. Yes. For example, in *Green Mountain Power Corp.*, 61 FERC ¶ 61,203 (1992), Green Mountain and Burlington Electric had entered into a capacity exchange agreement. Due to Green Mountain's failure to comply with the Commission's prior notice requirements, Green Mountain was required to revise its rates under the agreements to reflect its variable O&M costs. Although Green Mountain argued that it did not owe any refunds for what was essentially an "energy-only transaction," the Commission disagreed. The Commission held that to the extent Green Mountain received any contributions to fixed costs, albeit, through an in-kind payment, Green Mountain was required to refund an appropriate portion of this amount with interest. Similarly, in *United Illuminating Co.*, 61 FERC ¶ 61,027 (1992), which involved a power exchange agreement, the Commission ordered refunds to reflect any rates that exceeded the variable O&M expenses and refunds for any additional amounts to reflect the contributions to fixed costs recovered through in-kind payments (i.e., any unit exchange), plus interest. In addition, the Commission has, in the past, ordered members of the WSPP to refund the difference between rates for service or exchanges to ensure that consumers did not pay exorbitant rates. *See Western Systems Power Pool*, 55 FERC ¶ 61,154 at 61,492 (1991). Thus, the Commission does not differentiate between exchanges or sales for purposes of determining refunds.

Q. Has the ISO identified energy exchange transactions that took place during the refund period?

A. Yes. In discovery produced in the Refund Proceeding, the ISO provided information about energy exchange transactions in response to discovery requests by Duke and the California Parties in "Attachment Duke-ISO-162.xls" and "ISO Exchange Running totals.xls," the latter in response to Exh. No. ISO-8 (Refund Proceeding).

1 Q. What amounts of energy were involved in these exchanges with the ISO?

2 A. In total, during the Refund Period, the ISO received 419,729 MWh of exchange
3 energy and returned 824,899.5 MWh of exchange energy. Exh. No. CA-331
4 contains a copy of Attachment Duke-ISO-162, which shows the volumes of
5 exchanges, broken down by day.

6 Q. Did the ISO mitigate these transactions in the Refund Proceeding?

7 A. No.

8 Q. What was the ISO's rationale for excluding these exchange transactions from
9 mitigation?

10 A. The ISO stated that, since energy exchange transactions were "non-monetary" in
11 nature, they were exempt from mitigation. In addition, as noted above, the
12 Presiding Judge concluded that the Commission did not explicitly order that
13 exchanges should be mitigated and thus removed the issue from the Refund
14 Proceeding.

15 Q. Has CERS identified energy exchange transactions that took place between CERS
16 and sellers during the Refund Period?

17 A. Yes. In Exh. No. CA-14 (Appendix B), Mr. Green of CERS provides information
18 about energy exchange transactions that CERS entered into between January 17,
19 2001 and June 20, 2001.

20 Q. What amounts of energy were involved in these exchanges?

21 A. CERS engaged in exchanges with Powerex and BPA. With Powerex, CERS
22 received exchange energy totaling 227,819 MWh and returned energy totaling
23 536,200 MWh. Most of these exchanges were at a 2.5-to-1 ratio, and, as Mr.
24 Green points out, almost all of these were "like time" exchanges. With BPA,

CERS received 72,141 MWh of energy and returned 98,233 MWh. The exchange ratios ranged from 1.25-to-1 to 1.75-to-1.

Q. What is the significance of the fact that most of CERS' exchanges with Powerex were "like time" exchanges at a 2.5-to-1 ratio?

A. In general, energy has a "time of day" value, with energy delivered during the peak having a greater value than energy delivered off peak. With a "like time" exchange, the potential "time of day" difference in value is eliminated, because, for example, a counterparty that receives power on peak in an exchange returns power on peak. All things equal, the exchanges are equivalent as to the time of day variable.

The WSCC agreement provides for an exchange ratio no higher than 1.5-to-1. For a "like kind" exchange, a fair ratio would be significantly lower. The fact that most of Powerex's exchanges with CERS were "like kind" and at a 2.5-to-1 ratio, indicates that they were unreasonable to the point of being extortive. The implicit prices displayed in Mr. Green's Appendix B bear out this point. Most of the energy provided by Powerex came at a cost to CERS of approximately $300 MWh.

Q. Since energy exchange transactions are paid for in kind, and not at a particular price, how can they be mitigated?

A. The value of the commodity can be converted to a price per MWh of energy sold. This price can then be mitigated to calculate the refund obligation.

Q. Can you please explain in detail how this would work?

A. Assume that an exchange seller provided 1 MWh of energy to the ISO in an interval when the MMCP was $200/MWh, and the ISO was required to return 2

MWh to the exchange seller in an interval when the MMCP was $150/MWh. Assume further that the market was charging the ISO $250/MWh in the hour of the return. It is clear in this example that the ISO would have spent $500 to acquire the 2 MWh that it returned to the exchange seller, so the cost to the ISO for the 1 MWh it originally purchased was $500/MWh. That cost gets reduced partially, because the cash purchases of the 2 MWh of energy from third parties will be reduced to the MMCP for the hour in which the energy was purchased -- $150/MWh in our example -- for a total cost of $300 post-mitigation to purchase the 2 MWh that were returned to the exchange seller. But that means that the ISO (and in turn buyers) have still paid $300/MWh for the 1 MWh of energy that was procured from the exchange seller. Because the exchange seller provided the 1 MWh of energy in an hour in which the MMCP was $200/MWh, the exchange seller should reasonably be asked to pay a refund of $100 for the 1 MWh of energy it provided.

Q. Under the method you propose, aren't the actual purchases of energy needed in order to return energy already mitigated, so that your method results in double mitigation?

A. The actual purchases for return are mitigated, but no double mitigation results. To understand why, let's refer back to my earlier example. The ISO bought 2 MWh of energy for cash, at $250/MWh, to return to the exchange counterparty who had initially provided 1 MWh of energy. If the MMCP was $150/MWh in the hour when the 2 MWh was purchased, the seller of the 2 MWh will have to refund $100/MWh for each of the 2 MWh sold. This mitigation of the sales by the third parties does provide a partial remedy. But, as pointed out in the example, the ISO would still end up paying a total of $300 for the initial 1 MWh of energy, which was purchased in an hour when the MMCP was $200/MWh. The $100 shortfall

1 that the ISO is left with is then passed on to buyers. Only an additional refund
2 from the exchange seller of the $100/MWh will cap the prices at the MMCP in the
3 hour when the energy was originally supplied, consistent with the Commission's
4 orders. Requiring mitigation from the exchange seller is not "double mitigation" -
5 - the exchange seller under my method properly pays a refund to reduce the cost to
6 buyers down to the level of the MMCP.

7 Q. Does the method of mitigation that you propose ignore the flexibility or "capacity
8 value" of exchange sellers who say they were ready to provide the ISO and CERS
9 with large and flexible quantities of energy on a next hour basis?

10 A. It does not appear that there was any "capacity value" that should be factored into
11 mitigation. One would expect an exchange purchaser to make every attempt to
12 return the lowest cost energy possible. The problem is that, during the energy
13 crisis, there was no low cost energy to be had -- during peak hours or off-peak
14 hours. Moreover, the payment arrangements for energy exchanges were of great
15 value to exchange sellers such as Powerex and BPA. Unlike other sellers, they
16 were paid for all of the energy they supplied through these deals.

17 Indeed, the value of entering into exchanges to sellers can be seen in one example
18 from a PacifiCorp exchange with the ISO. PacifiCorp had bid into the ISO a block
19 of energy at $2500/MWh. To the PacifiCorp trader's surprise, the ISO accepted
20 the bid. In order to avoid being subject to the same high price or even higher
21 prices to replace this energy, PacifiCorp opted for an exchange "to eliminate the
22 risk associated with the replacement energy." Exh. No. PACW-5 (Refund
23 Proceeding) at 5-6. The exchange was arranged on a 2-for-1 basis and the ISO
24 was required to return the energy within a week. This illustrates not only the
25 extraordinarily high prices that the ISO paid for energy exchange purchases, it also
26 illustrates that the benefits obtained by the sellers that engaged in these

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1 transactions were substantial, because the transactions allowed sellers to shift the
2 risk of paying these high prices in the market from the seller to the ISO.
3 Fundamentally, these sellers should not be permitted to benefit from the fact that
4 they, like the other OOM sellers who are subject to mitigation, withheld energy
5 from the PX and ISO's regular markets and instead demanded extraordinary and
6 excessive payments in return for the supply of power.

7 Q. Have you done an analysis of refunds that would be owed by sellers of exchange
8 energy to the ISO?

9 A. Dr. Stern has done an analysis of refunds associated with energy exchange sales in
10 his testimony. Exh. No. CA-3 at 84. He found that refunds owed by sellers of
11 exchanges are equal to $101.5 million.

12 Q. Have you done an analysis of refunds that would be owed by sellers of exchange
13 energy to CERS?

14 A. No, I have not been able to complete such an analysis at this time.

15 XV. CONCLUSION

16 Q. Does this conclude your testimony?

17 A. Yes.

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 CAROLYN A. BERRY

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

Executed on February 28, 2003.

C. A. Berry

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Not Available To Competitive Duty Personnel

Index of Relevant Material Template

Submitter (Party Name)	California Parties
Index Exh. No.	CA-8
Privileged Info (Yes/No)	Yes
Document Title	Appendices to Berry Testimony
Document Author	Dr. Carolyn A. Berry
Doc. Date (mm/dd/yyyy)	03/03/2003
Specific finding made or proposed	Prices in the ISO and PX Spot Markets from October 2, 2000 to June 20, 2001 were unjust and unreasonable. Prices before October 2, 2000 were not consistent with Sellers' market-based rate tariffs and those of the ISO and PX. Sellers withheld from the market. Numerous generators withheld by not bidding their output into the market even though their plants were fully operational. This withholding behavior occurred during numerous system emergencies. Numerous generators withheld generation from the market by bidding high, and in excess of their costs, so as to deliberately price themselves out of the market. Sellers submitted bids in the ISO Markets in order to exercise market power. Sellers participated in collusive acts. Sellers withholding and other market manipulation, not buyer underscheduling, led to forced reliance on the Real-Time Market. Sellers shared non-public generation outage information. .
Time period at issue	a) before 10/2000; b) between 10/2000 and 6/2001; c) after 6/2001 (Delete the two that do not apply, and this instruction)
Docket No(s). and case(s) finding pertains to *	Eloo-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	High prices in the ISO Real-Time Market for much of the May 2000 – June 2001 period were caused by the persistent attempts of certain in-state

evidence purports to show	June 2001 period were caused by the persistent attempts of certain in-state sellers and importers to manipulate the market by withholding supply and submitting bids at near ISO price cap levels. Reliant's manipulative behavior on June 21-22, 2000 was not an isolated event. There are additional instances, involving Reliant and others, of similar behavior. Sellers engaged in systematic bidding and "no bid" (withholding) behavior that is inconsistent with competition and contributed to the high and volatile prices in the Real-Time Market during the period May 1, 2000 through August 6, 2000. Anti-competitive bidding practices consisted of: hockey stick bids; persistent bids at or near the price cap; bid spikes; periods of no bidding when a unit's capacity was operable, uncommitted and apparently economic, particularly just prior to submitting bid price spikes; and bids from units with similar costs at very different prices. All of these types of bids were in general unrelated to the underlying costs of production. ISO emergencies, particularly those declared between May 2000 to August 5, 2000, were exacerbated by the supply and bidding behavior of certain in-state generators and importers. These emergencies were arguably caused by this perverse supply and bidding behavior. Finally, perverse bidding behavior was coordinated among sellers. On numerous occasions in-state generators and importers raised their bid prices on the same days, during emergency and non-emergency days alike. This coordination constituted either tacit or explicit collusion. Exchanges between BPA, Powerex and other sellers, on one hand, and the ISO and CERS, on the other hand, during the period November 2000 through June 2001, were done at ratios that resulted in substantial overcharging for energy sold into California.
Party/Parties performing any alleged manipulation	Reliant; Mirant; Dynegy; Williams; Duke; Enron; Powerex; LADWP; Idaho Power; BPA.

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

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KEY QUALIFICATIONS:

Dr. Berry specializes in market design, policy formation, and regulatory issues in the electric power industry. As a consultant, she has worked in the areas of RTO development ancillary services market design, electricity market design, investment strategy, electricity trade, and federal regulation for a variety of clients both in the US and abroad. Prior to her work in consulting, Dr. Berry held positions in Offices of Administrative Litigation and Economic Policy at the Federal Energy Regulatory Commission, where she provided advisory support in Commission casework, wrote testimony, and advised/educated Commission staff on economic issues. At the Commission she was involved with a wide variety of issues including electric/electric and electric/gas mergers; independent system operators; market restructuring proposals including extensive involvement with the analysis of the California markets; transmission rights and other physical/financial transmission contracts; and market rules including congestion management rules, incentives, and market monitoring.

EDUCATION:

Ph.D. Economics	NORTHWESTERN UNIVERSITY Evanston, Illinois
B.S. Economics	UNIVERSITY OF MINNESOTA Minneapolis, Minnesota
B.A. Spanish	UNIVERSITY OF MINNESOTA Minneapolis, Minnesota (with a minor in Foreign Studies)

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Course work at:

1983	Université de Lyon II, Lyon, France
1982	Fundación José Ortega y Gasset, Toledo, Spain
1981	Corporación Tecnológica de Bolivar, Cartagena, Colombia

EMPLOYMENT:

2002	INDEPENDENT CONSULTANT **Washington, D.C.**
2002	CHARLES RIVER ASSOCIATES, INC. Washington, D.C. *Principal*
2000 – 2001	NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC. Washington, D.C. *Senior Consultant*
1994 – 2000	FEDERAL ENERGY REGULATORY COMMISSION Washington, D.C. Office of Administrative Litigation Office of Economic Policy *Economist*
1992 – 1993	UNIVERSITAT POMPEU FABRA Barcelona, Spain Facultat De Ciencies Economiques *Assistant Professor*
1989 – 1992	NORTHWESTERN UNIVERSITY Evanston, IL; Department of Economics Chicago, IL; University College *Lecturer*

CONSULTING EXPERIENCE:

- Drafted recommendations on institutional strengthening for ANEEL, the federal electricity regulator in Brazil.
- Assisted the National Electricity System Operator (ONS) in the development of economically efficient methods of procuring ancillary services that are compatible with

the Brazilian electricity market. Examined the feasibility of market-based provision of ancillary services in the electric sector and drafted a proposal for the commercialization of these services by the system operator.

- Developed two-week training session for foreign executives on energy trading in the U.S.
- Managed a review of the U.S. electricity market in the southwest Sunbelt region for a European client.
- Conducted a review of ancillary services markets in restructured electricity markets around the world to support U.S. client's ancillary services proposal at FERC.
- Provided advice on Regional Transmission Organization development and proposal.
- Prepared and filed testimony on behalf of Pacific Gas and Electric relating to charges in the California energy markets.
- Prepared a daylong workshop on the history of the California restructuring, the current operation of the California markets, the current crisis, and the future path of restructuring in California.
- Prepared an analysis of retail access provisions in New England.
- Prepared market power analyses to support various FERC applications for market based rates and the purchase of generation facilities.

TESTIMONY:

Declaration of Dr. Carolyn A. Berry on Behalf of Pacific Gas & Electric Company and the California Parties in response to the Commission's request for comments regarding the method for determining natural gas prices for purposes of calculating refunds as described in the staff report, "Initial Report on Company-Specific Separate Proceedings and Generic Reevaluations; Published Natural Gas Price Data; and Enron Trading Strategies" in Docket PA02-2-000, in *San Diego Gas and Electric Company, et. al., Investigation of Practices of the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-045, EL00-98-042, October 15, 2002.

Prepared Surrebuttal Testimony of Dr. Carolyn A. Berry on Issues 2 and 3 Submitted on Behalf of the California Parties in *San Diego Gas and Electric Company, et. al., Investigation of Practices of the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-045 et. al., August 9, 2002.

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Prepared Rebuttal Testimony on Issues 2 and 3 of Dr. Carolyn A. Berry on Behalf of the California Parties in *San Diego Gas and Electric Company, et. al., Investigation of Practices of the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-045 et. al., July 26, 2002.

Prepared Responsive Testimony on Issues 2 and 3 of Dr. Carolyn A. Berry on Behalf of the California Parties in *San Diego Gas and Electric Company, et. al., Investigation of Practices of the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-045 et. al., July 3, 2002.

Prepared Rebuttal Testimony on Behalf of the California Parties in *San Diego Gas and Electric Company, et. al., Investigation of Practices of the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-045 et. al., February 25, 2002.

Declaration of Dr. Carolyn A. Berry in Support of Response of the California Parties in *San Diego Gas and Electric Company, et. al., Investigation of Practices of the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-001, EL00-98-001et. al., February 4, 2002.

Prepared Supplemental Responsive Testimony on Behalf of the California Parties in *San Diego Gas and Electric Company, et. al., Investigation of Practices of the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-045 et. al., January 31, 2002.

Prepared Responsive Testimony on Behalf of the California Parties in *San Diego Gas and Electric Company, et. al., Investigation of Practices of the California Independent System Operator and the California Power Exchange*, Docket Nos. EL00-95-045 et. al., November 6, 2001.

Testimony on behalf of Pacific Gas and Electric Company in Dockets EL00-95-031, etc., Settlement Proceedings in front of Chief Judge Wagner, July 8, 2001.

Testimony on behalf of Pacific Gas and Electric Company in Dockets EL00-95-000, etc., Comments, Motion for Expedited Relief, and Application for Rehearing of PG&E, filed November 22, 2000.

Prepared Direct Testimony on behalf of the Federal Energy Regulatory Commission in Dockets ER98-495-000 etc., Pacific Gas & Electric Company, *et. al.*; ER98-496-006 etc., San Diego Gas & Electric Company, *et. al.*; and ER98-496-000 etc, San Diego Gas & Electric Company, *et. al.*, RMR proceedings, filed February 8, 2000.

PAPERS:

"Market Power Analysis of the Electricity Generation Sector," by William H. Hieronymous, J. Stephen Henderson, and Carolyn A. Berry, *Energy Law Journal*, Vol.23, No.1 (2002).

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"Understanding how Market Power Can Arise in Network Competition: A Game Theoretical Approach," by Carolyn A. Berry, Benjamin F. Hobbs, William A. Meroney, Richard P. O'Neill, and William R. Stewart, Jr., *Utilities Policy*, Vol.8, No.3 (September 1999).

"Why are nodal prices sometimes higher than $1000 in PJM if supply bids are capped at $1000?" economic note, FERC, Aug. 1999.

"Congestion, Transmission Loading Relief, and Reliability," written comments for Infocast Conference on Congestion Management, Washington, DC, March 25, 1999.

PRESENTATIONS:

"California Energy Crisis," Kogod Interative 2002 3rd Annual MBA Conference on Business Trends, American University Kogod School of Business, Washington, DC. Feb. 23, 2002.

"California Electric Industry Restructuring: What Went Wrong? Where Do We Go From Here?" Forum for Women State Legislators, Power Politics: Energy Policy in the States, Dana Point, CA, November 17, 2001.

"Distribution Services Under Retail Access," World Bank Presentation, Washington, DC, June 21, 2001.

"California Power Crisis: Can It Happen To Us?" Presentation to Iberdrola, New York, NY, February 6, 2001.

"California Power Crisis: Implications for Power Sector Reform in Emerging Economies?" Seminar to Energy Markets and Reform Thematic Group, World Bank, made jointly with William Meroney, FERC, January 11, 2001.

"California Electricity Markets and the Summer 2000," Presentation to the Brazilian Guaraniana Group, Washington, DC, November 29, 2000.

"California Electricity Markets, with Comments on Western Power Trading," Presentation to Iberdrola, New York, NY, October 17, 2000.

"Transmission Pricing Arrangements and Their Influence on Investment," World Bank Institute Seminar on Building Knowledge and Expertise in Infrastructure Finance, Washington, DC, July 6, 2000.

"The FERC's New RTO NOPR: How it will Affect Transmission Congestion Management and Transmission Pricing," Infocast Congestion Pricing & Forecasting Conference, Washington, DC, November 18, 1999.

"Status of FERC (De-) Regulation," Energy Industry Essentials, A Manager's Guide to the New Power Market, IBC USA Conferences, Inc., Chicago, IL, October 18, 1999.

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"Analyzing Strategic Behavior in Transmission Networks," by Carolyn A. Berry, Benjamin F. Hobbs, William A. Meroney, Richard P. O'Neill, and William R. Stewart, Jr., presentation at the IEEE/PES Power Engineering Society 1999 Summer Meeting, Edmonton, Alberta, Canada, July 22, 1999.

"Emerging Regulatory Trends," GE Harris Energy Control Systems, Power Systems Restructuring Seminar, Fort Collins, CO, April 26, 1999.

"Mitigation of Market Power in a Liberalized Sector: Regulatory Issues," Energy Week '99, The Global Shakeout, The World Bank, Washington, DC, April 6, 1999.

"Keynote Address: FERC's Perspective on the Impacts of Transmission Loading Relief on the Reliability of the Grid, Redispatch, and Other Congestion Management Techniques," Congestion Management: How Transmission Loan Relief and Congestion Pricing Will Impact Competitive Markets, Infocast Conference, Washington, DC, March 25, 1999.

"Analyzing Strategic Behavior in Transmission Networks," by Carolyn A. Berry, Benjamin F. Hobbs, William A. Meroney, Richard P. O'Neill, and William R. Stewart, Jr., presentation at the IEEE/PES Power Engineering Society 1999 Winter Meeting, New York, NY, February 3, 1999.

"Electric Network Transmission Pricing: The U.S. Regulatory Experience," A conference sponsored by the ACCC and the University of Melbourne, Melbourne, Australia, December 14, 1998.

"Keynote Address: How Will We Purchase Power in the Future," Wholesale Power in the West (IBC Conference), Las Vegas, NV, November 11-13, 1998.

"FERC and Electric Markets, An Overview," presentation to students in Telecommunications and Technology Policy course, Robert B. Smith School of Business, University of Maryland, September 18, 1998.

"Regulations: Looking at Hydro Regulations in a New Way," HydroVision '98, Reno, NV, July 28-31, 1998.

"Analyzing Strategic Behavior in Transmission Networks," by Carolyn A. Berry, Benjamin F. Hobbs, William A. Meroney, Richard P. O'Neill, and William R. Stewart, Jr., presentation at the IEEE/PES Power Engineering Society 1998 Summer Meeting, San Diego, CA, July 12-16, 1998.

"Analyzing Strategic Behavior in Transmission Networks," by Carolyn A. Berry, Benjamin F. Hobbs, William A. Meroney, Richard P. O'Neill, and William R. Stewart, Jr., Paper presentation to FERC Staff, April 17, 1998.

"Politics and Regulatory Issues: FERC," Energy Expo, Strategies for the New Century, New Jersey, March 25, 1998.

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"FERC Policies on Market Power, Transmission, and Asset Sales," Boston, MA, December 4, 1997.

"How FERC Works," Department of Energy presentation to Indian Delegation, Washington, DC, October 29, 1996.

"FERC's Open Access Rule," Power Marketing & Brokering, Chicago, IL, July 19, 1996.

"The Electricity Market: Adapting to a Competitive Environment: The FERC Perspective," Houston, Texas, April 11, 1996.

"Overview of Electricity and Natural Gas in the U.S.," PowerFair '96, New Orleans, LO, March 25, 1996.

"Futures, Options, and Other Derivatives: What Are They and How Should They Be Regulated?" Forty-Ninth Annual FEBA Meeting, Washington, DC, May 17, 1995.

"Institutional Change in the U.S. Wholesale Electric Industry: Open Access and RTGs," Debat Public Sur L'Energie Au Quebec, Montreal, Quebec, May 2, 1995.

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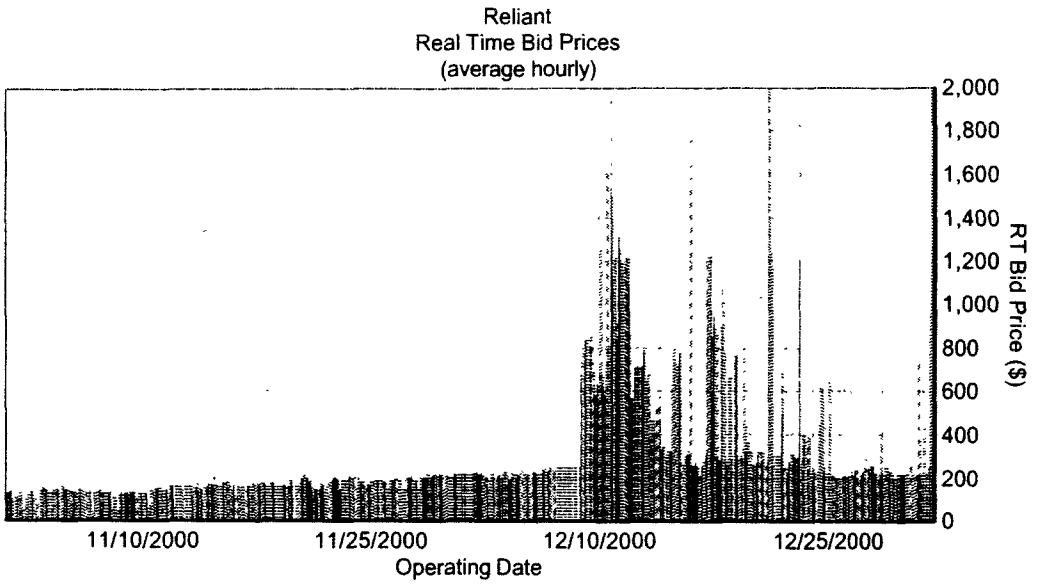
APPENDIX B

Real Time Bid Prices
In the ISO Imbalance Energy Market
November – December 2000
Reliant, Mirant, Dynegy, Williams, Duke, Powerex, LADWP, Idaho Power



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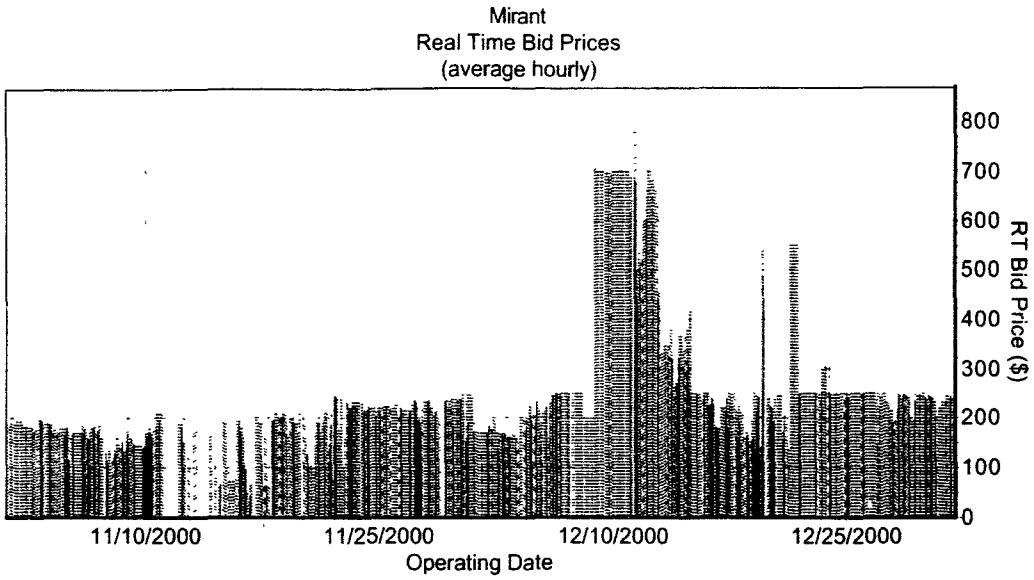

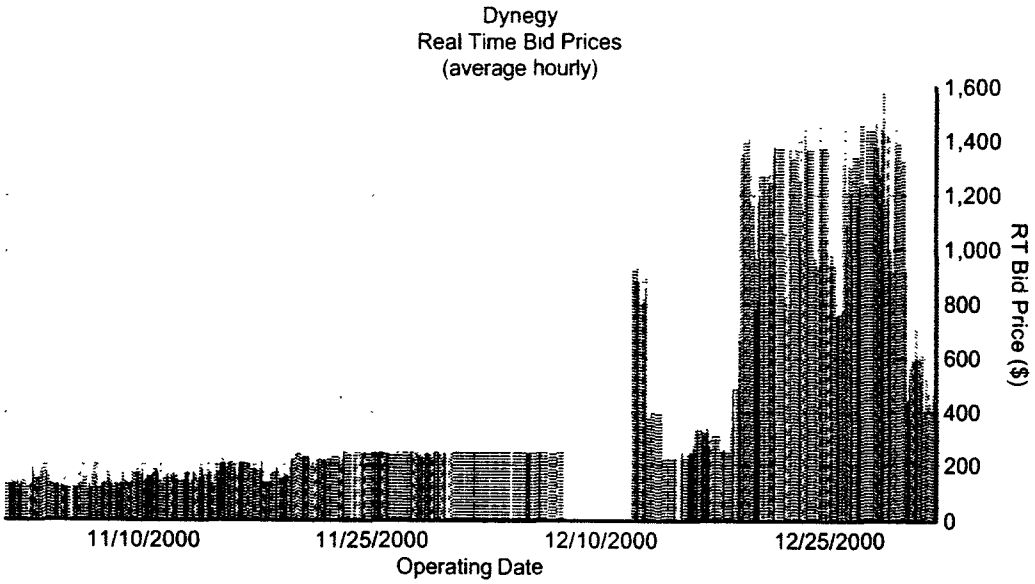

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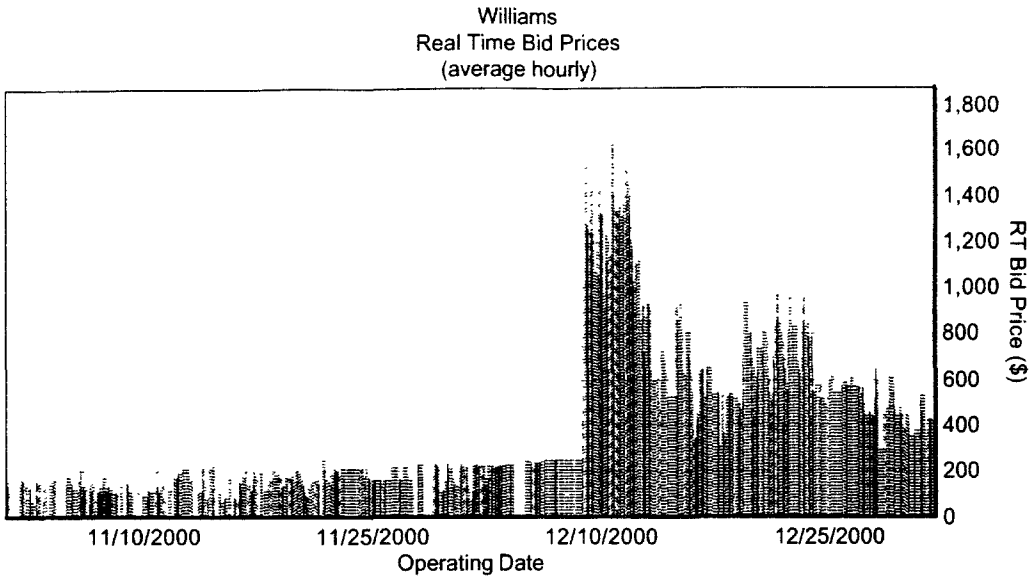

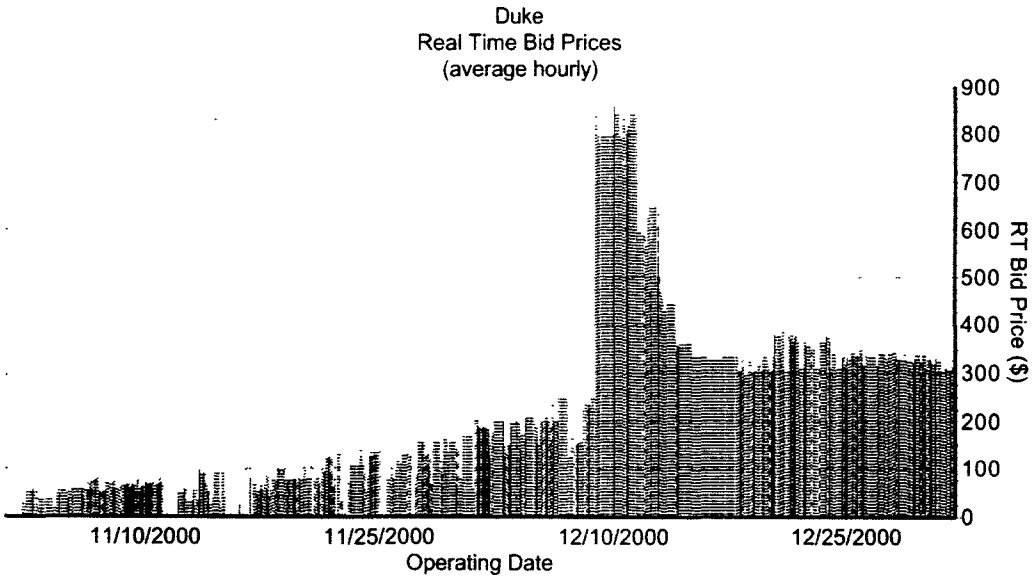

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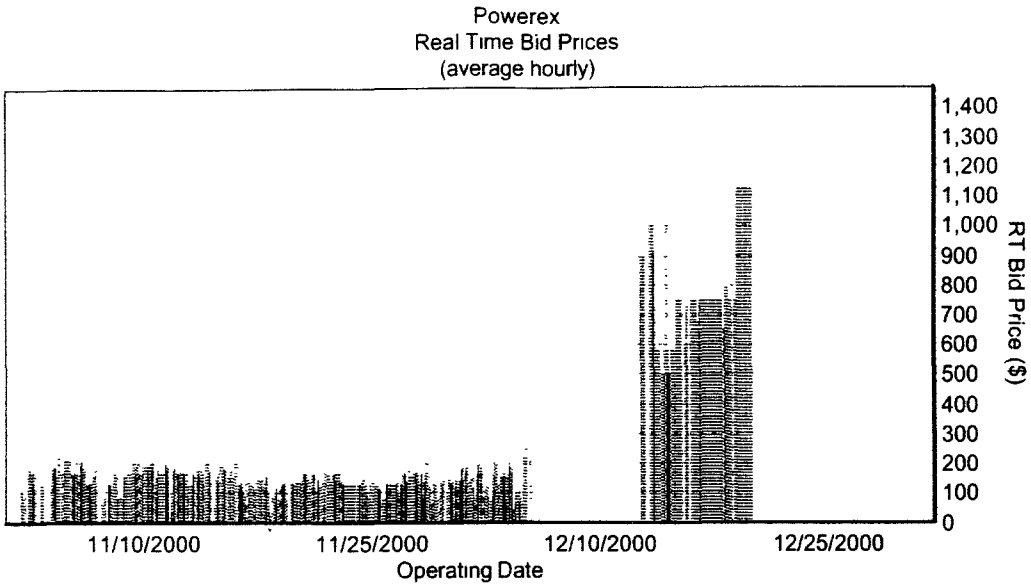

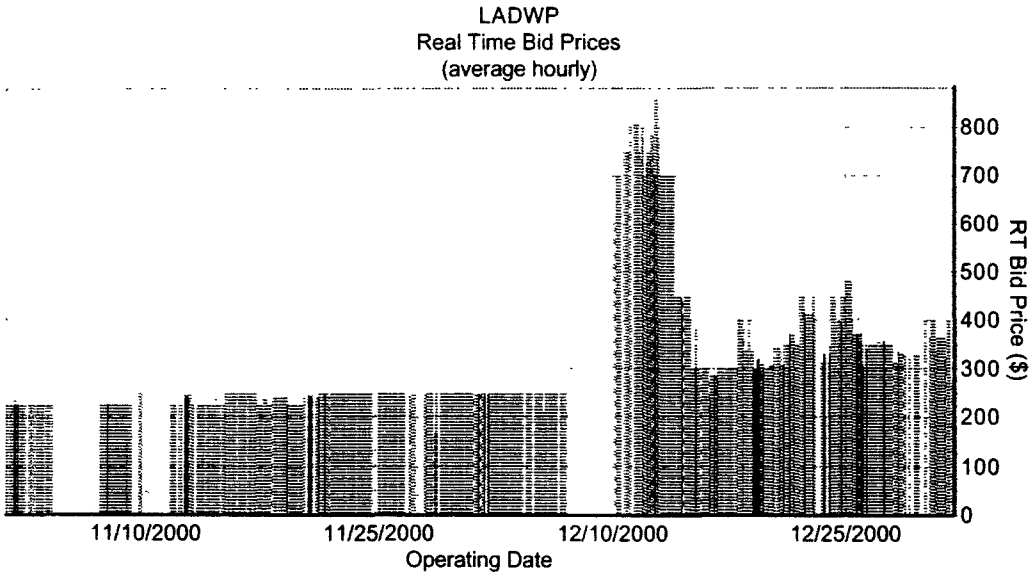
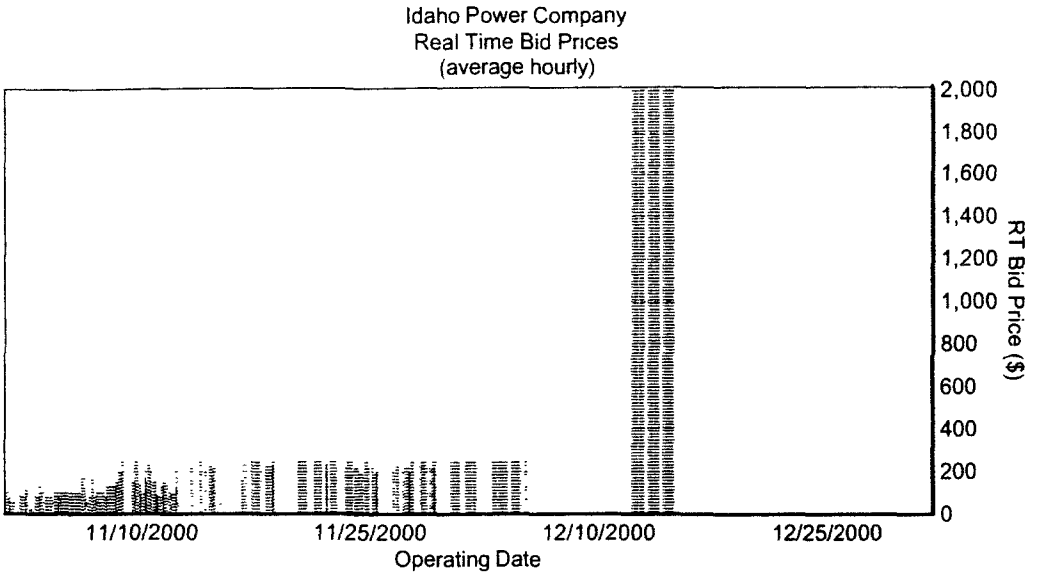
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