

THE UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

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

PREPARED SUPPLEMENTAL DIRECT TESTIMONY OF
DR. ERIC HILDEBRANDT ON BEHALF OF
THE CALIFORNIA INDEPENDENT SYSTEM
OPERATOR CORPORATION

1 Q. PLEASE STATE YOUR NAME.

2 A. Dr. Eric Hildebrandt.

3

4 Q. ARE YOU THE SAME DR. ERIC HILDEBRANDT WHO PREVIOUSLY

5 FILED TESTIMONY IN THIS PROCEEDING ON BEHALF OF THE

6 CALIFORNIA INDEPENDENT SYSTEM OPERATOR (“ISO”)?

7 A. Yes. On October 9, 2000, I submitted Prepared Direct Testimony (“initial

8 testimony”) explaining how the ISO arrived at the mitigated price to be

9 used in determining the amount of refunds due for transactions in the ISO

10 and California Power Exchange (“PX”) markets during the period of

1 October 2, 2000 through June 20, 2001 (the “refund period”) pursuant to
2 the methodology set forth in the Federal Energy Regulatory Commission’s
3 (“Commission” or “FERC”) July 25, 2001 Order, 96 FERC ¶ 61,120 (2001)
4 (“July 25 Order”). Those mitigated prices were attached to my initial
5 testimony as Exhibit Nos. ISO-3 and ISO-4.

6

7 **Q. WHAT IS THE PURPOSE OF THIS SUPPLEMENTAL TESTIMONY?**

8 A. The purpose of this supplemental direct testimony is to explain a
9 modification made by the ISO to the methodology for calculating the
10 mitigated prices during the refund period, as described in my previous
11 direct testimony, required by the Commission’s December 19, 2001 Order,
12 97 FERC ¶ 61,275 (2001) (“December 19 Order”). Included with this
13 testimony as Exhibit Nos. ISO-17 and ISO-18 are the new mitigated prices
14 calculated by the ISO using this modified methodology.

15

16 **Q. WHY DID THE METHODOLOGY DESCRIBED IN YOUR INITIAL**
17 **DIRECT TESTIMONY NEED TO BE MODIFIED AS A RESULT OF THE**
18 **DECEMBER 19 ORDER?**

19 A. The Commission, in the December 19 Order, granted a request for
20 rehearing made by the Indicated California Generators concerning the
21 method of determining the marginal unit dispatched in real time. As
22 explained by the Commission in the December 19 Order:

23 The [Indicated California Generators] assert that the Commission's
24 approach mistakenly focuses on identifying the unit with the highest

1 heat rate and instead "should apply the 'North' gas cost index to the unit
2 in the North with the highest heat rate, and apply the 'South' gas cost
3 index to the unit in the South with the highest heat rate. Whichever unit
4 has the highest total costs should serve as the system-wide marginal,
5 market clearing unit." [December 19 Order, slip op. at 65]
6

7 The Commission, agreeing with the California Generators'
8 proposal, directed the ISO to recalculate mitigated prices during the refund
9 period, incorporating this modification into the methodology outlined in the
10 July 25 Order:

11 We will grant Indicated California Generators' rehearing request. They
12 correctly describe the appropriate method for determining the mitigated
13 reserve deficiency MCP using separate gas cost indices for northern
14 and southern California, which will lead to the best approximation of the
15 marginal costs of the last unit dispatched. Therefore, we will direct the
16 ISO to recalculate the mitigated reserve deficiency MCP for each hour
17 of the refund period in the manner prescribed in our orders, as modified
18 by the Indicated California Generators, and to provide the data to Judge
19 Birchman for use in the refund hearing. [December 19 Order, slip op. at
20 67].
21

22 **Q. GENERALLY, HOW DOES THIS MODIFICATION COMPARE TO THE**
23 **METHODOLOGY USED IN YOUR PREVIOUS CALCULATIONS?**

24 A. As described in my initial testimony, the ISO identified the marginal unit in
25 each 10-minute interval based on the incremental heat rates of units
26 dispatched in the ISO's Real Time Market, Ex. No. ISO-1 at 33:6-33:30,
27 and then calculated the mitigated price by multiplying this heat rate by the
28 corresponding spot market gas price, adding \$6 for other variable
29 operating costs, and, finally, adding a 10% credit risk premium for periods
30 after January 6, 2001. Ex. No. ISO-1 at 53:8-55:7. In effect, the
31 December 19 Order requires the marginal unit to be identified by first

1 calculating the marginal operating costs for each unit eligible to set the
2 mitigated price by multiplying each unit's heat rate by the appropriate spot
3 market gas cost (plus \$6 O&M and a 10% adder after January 5, 2001),
4 and then selecting the marginal unit based on these marginal operating
5 costs, rather than unit heat rates.

6

7 **Q. HOW DID THE MODIFICATION REQUIRED BY THE DECEMBER 19**
8 **ORDER AFFECT THE ISO'S CALCULATION OF THE MARGINAL UNIT**
9 **DURING INTERVALS IN WHICH ONE OR MORE BIDS FOR**
10 **INCREMENTAL IMBALANCE ENERGY WERE ACCEPTED BY THE**
11 **ISO'S BALANCING ENERGY AND EX-POST PRICING ("BEEP")**
12 **SOFTWARE?**

13 A. As I explained in my initial testimony, during intervals in which one or more
14 bids for incremental Imbalance Energy were accepted by the ISO's BEEP
15 Software and the resulting dispatch instruction was "acknowledged" by the
16 unit's operator, the ISO selected the marginal unit based on the unit with
17 the *highest incremental heat rate* of all gas units with an acknowledged
18 incremental dispatch instruction during that interval. Ex. No. ISO-1 at
19 33:15-34:15. Based on the modification required by the December 19
20 Order, in recalculating the mitigated prices for intervals in which one or
21 more bids for incremental Imbalance Energy were accepted by the ISO's
22 BEEP Software and "acknowledged," the ISO selected as the marginal

1 unit that unit with the *highest marginal operating costs* during a particular
2 interval, determined in the manner described above.

3

4 **Q. IN RECALCULATING MITIGATED PRICES PURSUANT TO THE**
5 **DECEMBER 15 ORDER, HOW DID THE ISO SELECT THE MARGINAL**
6 **UNIT DURING INTERVALS IN WHICH THERE WAS NO**
7 **ACKNOWLEDGED INCREMENTAL DISPATCH INSTRUCTION, BUT IN**
8 **WHICH THERE WERE ONE OR MORE ACKNOWLEDGED**
9 **DECREMENTAL DISPATCH INSTRUCTIONS?**

10 A. During intervals in which no gas unit had an acknowledged dispatch
11 instruction for incremental real time energy, but one or more gas units had
12 a decremental dispatch instruction (representing an instruction to
13 decrease output below a unit's final Hour Ahead schedule), the ISO
14 originally derived the marginal unit based on the *lowest incremental heat*
15 *rate* of the gas units with an acknowledged decremental dispatch
16 instruction during the interval. Ex. No. ISO-1 at 34:16-35:21. In
17 recalculating mitigated prices as required by the December 19 Order, the
18 ISO selected the marginal unit during these intervals by selecting from all
19 gas units with an acknowledged decremental dispatch instruction that unit
20 with the *lowest marginal operating costs*, determined as described above.

21

22

23

1 Q. IN RECALCULATING MITIGATED PRICES PURSUANT TO THE
2 DECEMBER 15 ORDER, HOW DID THE ISO SELECT THE MARGINAL
3 UNIT DURING INTERVALS IN WHICH NO UNIT HAD EITHER AN
4 ACKNOWLEDGED INCREMENTAL OR DECREMENTAL DISPATCH
5 INSTRUCTION?

6 A. In my initial testimony, I explained that during intervals in which no gas
7 unit had either an acknowledged incremental or an acknowledged
8 decremental dispatch instruction, the ISO determined the marginal unit by
9 selecting the unit with the *lowest incremental heat rate* from all units with
10 bids for incremental energy submitted to the ISO. Ex. No. ISO-1 at 35:23-
11 36:30. In recalculating the mitigated prices consistent with the
12 modification set forth in the December 19 Order, the ISO selected the
13 marginal unit during these intervals by choosing from those units that had
14 submitted bids for incremental real time energy to the ISO the unit with the
15 *lowest marginal operating costs*, calculated as described above.

16
17 Q. DURING INTERVALS IN WHICH THERE WERE NO ACKNOWLEDGED
18 INCREMENTAL DISPATCHES, WHY DID THE ISO, FOR PUPOSES OF
19 RECALCULATING MITIGATED PRICES PURSUANT TO THE
20 DECEMBER 19 ORDER, SELECT THE MARGINAL UNIT BASED ON
21 THE UNIT WITH THE LOWEST MARGINAL OPERATING COSTS?

22 A. In recalculating mitigated prices in order to reflect the modification
23 required by the December 19 Order, the ISO selected the marginal unit

1 during intervals in which there were no acknowledged incremental
2 dispatch instructions in the manner I described in the previous two
3 responses for the same reasons that I gave in my initial testimony for why
4 the ISO selected the marginal unit during these intervals based on the unit
5 with the lowest incremental heat rate. See Ex. No. ISO-1 at 37:1-39:14.
6 The same operational and economic rationales for using the lowest
7 incremental heat rate to identify the marginal unit during intervals in which
8 there was no acknowledged dispatch instruction for incremental
9 energy also support selecting as the marginal unit that unit with the lowest
10 marginal operating costs during these intervals.

11

12 **Q. HOW DOES THE MODIFICATION REQUIRED BY THE DECEMBER 19**
13 **ORDER AFFECT THE RESULTS OF THE ISO'S MITIGATED PRICE**
14 **CALCULATION?**

15 A. Due to differences in spot market gas prices for units in northern and
16 southern California, this modification results in a higher mitigated price
17 during some intervals when the ISO was dispatching gas-fired units for
18 incremental energy. This occurs in instances when the unit with the
19 highest heat rate has a lower overall fuel cost (heat rate multiplied by spot
20 market gas price) than another unit which may have a lower heat rate but
21 is located in a different gas region with higher spot market gas prices.
22 However, during intervals when no gas-fired units were dispatched to
23 provide real time energy, this modification sometimes results in a lower

1 mitigated price. During intervals when gas fired units only received
2 decremental dispatch instructions, this occurs when the unit with the
3 lowest incremental heat rate that received a decremental dispatch has a
4 higher overall fuel cost than some other unit with a higher incremental
5 heat rate that also received a decremental dispatch instruction during that
6 interval. Similarly, during intervals when no gas fired units received
7 incremental or decremental dispatch instructions, this occurs when the
8 unit with the lowest incremental heat rate that had an incremental energy
9 bid submitted in the Real Time Market has a higher overall fuel cost than
10 some other unit with a higher incremental heat rate that also had an
11 incremental energy bid that hour.

12

13 **Q. DOES THE DECEMBER 19 ORDER INCLUDE ANY CLARIFICATIONS**
14 **OR GRANT ANY OTHER REQUESTS FOR REHEARING THAT**
15 **REQUIRE MODIFICATION OF YOUR INITIAL TESTIMONY, IN ANY**
16 **WAY OTHER THAN THAT DESCRIBED ABOVE, CONCERNING THE**
17 **METHODOLOGY FOR CALCULATING MITIGATED PRICES?**

18 A. No. As I noted above, the Commission, in the December 19 Order,
19 explicitly required the ISO to recalculate mitigated prices for the refund
20 period *in the manner prescribed in the Commission's previous orders*, but
21 taking into account the single modification proposed by the California
22 Generators. Moreover, the Commission, in addressing ongoing hearing
23 procedures in this proceeding, noted that it “[did] not anticipate that

1 significant changes to the formula(e) previously used by the ISO” to
2 calculate the mitigated prices would be necessary. December 15 Order,
3 slip op. at 174.

4

5 **Q. HAVE YOU RECALCULATED THE MITIGATED PRICES WITH THE**
6 **ONE MODIFICATION IDENTIFIED IN THE DECEMBER 19 ORDER?**

7 A. Yes. Revised calculations of the mitigated prices are included in Exhibit
8 Nos. ISO-17 (interval mitigated prices) and ISO-18 (average hourly
9 mitigated prices).

10

11 **Q. DOES THIS CONCLUDE YOUR SUPPLEMENTAL TESTIMONY?**

12 A. Yes, it does.

13