

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 REBUTTAL TESTIMONY OF
MARK ROTHLEDER ON BEHALF OF
THE CALIFORNIA INDEPENDENT SYSTEM
OPERATOR CORPORATION

1 Q. PLEASE STATE YOUR NAME.

2 A. Mr. Mark Rothleder

3

4 Q. ARE YOU THE SAME MARK ROTHLEDER WHO PREVIOUSLY FILED

5 TESTIMONY IN THIS PROCEEDING ON BEHALF OF THE

6 CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

7 (“ISO”)?

8 A. Yes.

9

10

1

2 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

3 A. The purpose of my rebuttal testimony is to respond to selected criticisms
4 and proposed modifications to the ISO's methodology for calculating
5 mitigated prices for purposes of determining refund liability pursuant to the
6 Commission's July 25 Order. Specifically, I address: (1) criticisms relating
7 to the ISO's methodology for calculating incremental heat rates from
8 average heat rate information provided by the generators; (2) the
9 modifications to the heat rate information used by the ISO proposed by the
10 California Parties and individual generators; (3) the proposed modification
11 of the ISO's use of the midpoint prices as opposed to peak prices in
12 calculating the average daily spot gas prices; and (4) the contention of one
13 supplier that a quantitative analysis demonstrates that the ISO's
14 methodology for calculating mitigated prices is flawed.

15

16 **Q. HOW IS YOUR TESTIMONY ORGANIZED?**

17 A. Section I addresses proposed revisions to the calculation of incremental
18 heat rates using the average heat rates provided by generators. Section II
19 addresses proposed revisions to the heat rate data submitted by
20 generators. Section III addresses proposed modifications to the
21 calculation of the gas proxy costs. Section IV addresses the contention
22 that a quantitative analysis of Commission data demonstrates that the
23 ISO's methodology for calculating mitigated prices is flawed.

1 **SECTION I: CALCULATION OF INCREMENTAL HEAT RATES**
2 **FROM AVERAGE HEAT RATES**
3

4 **Q. PLEASE SUMMARIZE THE STEPS THE ISO FOLLOWED IN**
5 **CALCULATING THE INCREMENTAL HEAT RATES.**

6 A. As I explained in my initial testimony, the ISO followed a three step
7 process in calculating incremental heat rates. These steps consisted of:

8 (1) the collection of average heat rates at selected operating points
9 from the generators;

10 (2) the derivation of average heat rate curves from the average heat
11 rate data submitted by generators followed by the calculation of
12 incremental heat rate curves from the average heat rate curves;

13 and

14 (3) if required, the adjustment of incremental heat rate curves to
15 ensure that the incremental heat rate curves were monotonically
16 increasing.

17

18 **Q. WHAT ARE THE MAJOR CRITICISMS OF THE ISO'S METHODOLOGY**
19 **FOR THE CALCULATION OF INCREMENTAL HEAT RATES THAT**
20 **YOU WILL ADDRESS?**

21 A. I will address the following criticisms:
22

23 (1) the allegation made by witnesses for the generators that the
24 incremental heat rates that the ISO has calculated from the

1 average heat rates provided by generators are “hypothetical” and,
2 therefore, inconsistent with Commission direction that “actual” heat
3 rates be used;

4 (2) the suggestion made by witnesses for the California Parties that the
5 ISO’s assumed linear relationship between measurement points for
6 determining the average heat rate curves biases the heat rates
7 upward and should be replaced by a more appropriate assumption;
8 and

9 (3) the suggestion by witnesses that the ISO discard the requirement
10 that the incremental heat rate curves be monotonically non-
11 decreasing.

12

13 **Q. DO YOU AGREE WITH THE ASSERTION THAT THE INCREMENTAL**
14 **HEAT RATES USED BY THE ISO IN CALCULATING THE MITIGATED**
15 **PRICE ARE HYPOTHETICAL HEAT RATES?**

16 A. No. In his direct testimony for the California Generators, Mr. Tranen
17 asserts that because the Commission refers to the use of “actual” heat
18 rates and not “hypothetical” heat rates, the Commission must have
19 intended that average heat rates be used in calculating the mitigated
20 price. Ex. No. GEN-1 (Prepared Direct and Answering Testimony of
21 Jeffrey Tranen) at 10:11-12:19. Mr. Tranen is in error. As I explained in
22 my initial testimony, both average and incremental heat rates are
23 ultimately calculated from actual input/output measurements. Thus,

1 incremental heat rates are no more hypothetical than average heat rates.
2 So long as the incremental heat rates have been determined based on
3 actual input/output measurements, then those incremental heat rates
4 reflect actual operational measurements.

5

6 **Q. WHAT DO YOU BELIEVE THE COMMISSION MEANT WHEN THEY**
7 **INSTRUCTED THE USE OF ACTUAL, RATHER THAN HYPOTHETICAL**
8 **HEAT RATES?**

9 A. I believe that the Commission meant that the calculation of the mitigated
10 prices should be based on the actual dispatch of units as opposed to a
11 simulated or hypothetical dispatch of units. The Commission used the
12 term "actual heat rate" to refer to the heat rate of the last unit that was
13 actually dispatched. I believe that the Commission used the term
14 "hypothetical heat rates" to refer to heat rates resulting from a hypothetical
15 dispatch of units. When the Commission rejected the use of "hypothetical
16 heat rates," it is clear that the Commission meant that it was rejecting a
17 hypothetical dispatch of units, not the use of incremental heat rates.

18

19

20

21

22

23

1 Q. ON BEHALF OF THE CALIFORNIA PARTIES, DR. STERN ASSERTS
2 THAT THE ISO'S ASSUMED LINEAR RELATIONSHIP BETWEEN
3 MEASURING POINTS TO CALCULATE AVERAGE HEAT RATE
4 CURVES OVERSTATES TRUE INCREMENTAL HEAT RATES.
5 COULD YOU PLEASE EXPLAIN WHY THE ISO ASSUMED A LINEAR
6 RELATIONSHIP TO DERIVE THE AVERAGE HEAT RATE CURVES
7 FROM THE AVERAGE HEAT RATE INFORMATION PROVIDED BY
8 THE GENERATORS.

9 A. The ISO assumed a linear relationship between the measurement points
10 in deriving average heat rate curves from the 11-point heat rate data
11 provided by Generators in order to maintain consistency with the data
12 structure used by the ISO systems for dispatching units. For production
13 purposes the bid data structure is made up of price quantity pairs that are
14 interpreted by the BEEP software to create a stair-step bid curve.
15 Although the BEEP software was not rerun to establish the mitigated
16 prices for the refund period, the ISO used a consistent mechanism
17 retrospectively for the refund period as would be used prospectively based
18 on the heat rate data.

19
20
21
22
23

1 **Q. DO YOU BELIEVE THAT THE “ARC LINE MEASUREMENT”**
2 **TECHNIQUE PROPOSED BY DR. STERN ON BEHALF OF THE**
3 **CALIFORNIA PARTIES IS A REASONABLE ALTERNATIVE?**

4 A. Yes, I do consider the approach proposed by Dr. Stern to be a reasonable
5 alternative. As noted by Dr. Stern, both the ISO’s approach and his
6 proposed approach use an arc line measurement technique. Ex. No.
7 CAL-1 (Prepared Responsive Testimony of Dr. Gary Stern) at 26:13-15.
8 The only difference between the two approaches is that the ISO assumed
9 a simple linear relationship between adjacent available data points, while
10 Dr. Stern’s approach attempts to fit a curve between the measured points.
11 While one may argue which approach is more accurate, both approaches
12 are still estimates. As stated previously, the linear approach adopted by
13 the ISO maintains consistency between the refund period and the
14 approach used prospectively.

15
16
17
18
19
20
21
22
23

1 Q. SEVERAL WITNESSES ALSO CLAIM THAT THE ISO SHOULD NOT
2 HAVE ADJUSTED THE INCREMENTAL HEAT RATE CURVES TO
3 ENSURE THAT THEY WERE MONOTONICALLY NON-DECREASING.
4 PLEASE EXPLAIN THE PRIMARY REASON THE ISO ADJUSTED THE
5 INCREMENTAL HEAT RATE CURVES TO BE MONOTONICALLY NON-
6 DECREASING.

7 A. As I explained in my initial testimony, the incremental heat rate curves
8 were adjusted when necessary to be non-decreasing for consistency with
9 the ISO's market design and software.

10

11 Q. IS THE MONOTONICALLY NON-DECREASING ASSUMPTION
12 REQUIRED FOR THE REFUND PERIOD?

13 A. Technically, no. Ex. No. GEN-1 (Tranen) 12:20-15:2; Ex. No. CAL-1
14 (Stern) 16:10-20:15. The assumption was made to maintain consistency
15 across the refund and prospective periods. However, the assumption
16 could be eliminated for the refund period, which would eliminate the need
17 for any adjustment of incremental heat rate curves.

18

19 Q. WHAT ABOUT THE ECONOMIC PRINCIPLE THAT "THE COST OF
20 ENERGY SHOULD INCREASE AS DEMAND INCREASES"?

21 A. In my initial testimony, I did suggest that using incremental heat rate
22 curves that were not monotonically non-decreasing would violate "the
23 economic principle that the cost of energy should increase as demand

1 increases.” Ex. No. CAL-1 (Stern) at 20:8. However, as both Mr. Tranen
2 and Dr. Stern noted, there is no such economic principle for a *specific*
3 *generating unit*. Ex. No. GEN-1 (Tranen) at 14:9-12; Ex. No. CAL-1
4 (Stern) at 20:7-10. Therefore, I would concede that whether or not the
5 cost of energy increases as demand increases for a *specific generating*
6 *unit* is determined by the technological characteristics of the generating
7 unit, not by any established economic principle.

8

9 **SECTION II: PROPOSED REVISIONS TO HEAT RATE DATA**

10

11 **Q. ARE YOU FAMILIAR WITH THE REVISIONS THAT HAVE BEEN**
12 **PROPOSED TO THE HEAT RATE INFORMATION PROVIDED BY**
13 **GENERATORS?**

14 A. Yes. In the initial testimony filed on November 6, 2001, a number of
15 changes were proposed by witnesses for the California Parties and for
16 individual Generators.

17

18 **Q. CAN YOU DESCRIBE THE REASONS FOR THE CHANGES**
19 **PROPOSED BY THE CALIFORNIA PARTIES?**

20 A. Yes. The witnesses for the California Parties propose changes to the heat
21 rates used by the ISO in calculating the mitigated prices for the following
22 reasons: (1) the heat rate data submitted by generators incorporate an
23 inappropriate 2% adjustment that was applicable to the RMR Agreements

1 but not appropriate for establishing the market clearing prices, Ex. No.
2 CAL-6 (Prepared Responsive Testimony of Dr. Carolyn Berry) at 3:12-5:6;
3 Ex. No. CAL-7 (Prepared Responsive Testimony of Jan J. Strack) at 7:7-
4 15 (2) the heat rate data submitted by generators are inconsistent with
5 actual heat rate measurements on record from RMR testing, Ex. No. CAL-
6 8 (Prepared Responsive Testimony of Neil E. Shockey) at 4:3-8:17; (3)
7 summer heat rate data were submitted when winter heat rate data were
8 more appropriate given that all but three weeks of the refund period
9 (October 2, 2000 through June 20, 2001) are included in the winter time
10 period, Ex. No. CAL-7 (Strack) at 7:17-22; and (4) the netting of on-site
11 load in heat rate data provided for the UCDMED_7_UNIT resource is
12 inappropriate. Ex. No. CAL-7 (Strack) at 8:16-11:12. The California
13 parties identified their recommended corrections to heat rate data in Ex.
14 No. CAL-13.

15

16 **Q. CAN YOU DESCRIBE THE REASONS FOR THE CHANGES**
17 **PROPOSED BY THE GENERATORS?**

18 A. Yes. Corrections to previously submitted heat rate data were submitted
19 by Williams, Dynegy, AES Placerita, and Pasadena. The witness for
20 Williams, Mr. Elliott, submitted corrected data for REDOND_7_UNIT 5
21 and REDOND_7_UNIT 6. Ex. No. DME-00 (Direct Testimony for Mr.
22 Dennis Elliott) 16:10-23. According to Mr. Elliot, the data initially
23 submitted to the ISO for these two units were from an out-of-date RMR

1 Agreement. Use of these corrected data would eliminate the negative
2 incremental heat rate observed by Mr. Shockey, testifying for the
3 California Parties. Ex. No. CAL-10 (Shockey) 8:1-8.

4
5 The witness for Dynegy, Mr. Williams, submitted corrected data for three
6 gas-fired combustion turbines units (Kearny 2, Kearny 3, and Miramar)
7 because, according to Mr. Williams, the initially submitted data were not
8 calculated correctly. Ex. No. DYN-14 (Prepared Supplemental Direct
9 Testimony of Kent Williams) at 4:14-5:2. A similar correction was
10 submitted by Mr. Strack, one of the witnesses for the California Parties.
11 Ex. No. CAL-7 (Strack) at 4:21-6:22.

12
13 The witness for AES Placerita, Ms. Lehmann, submitted revised heat rate
14 data for the Placerita unit for a portion of the refund period. She stated
15 that the revision was a result of operational changes that resulted in lower
16 total outputs and higher heat rates. Ex. No. AES-1 (Direct Testimony of
17 Jennifer Lehmann) at 5:16-6:2.

18
19 The witness for Pasadena, Mr. Endo, submitted revised heat rates for two
20 gas-fired combustion turbines. According to Mr. Endo, the changes were
21 designed to include start-up and no-load costs and were based on the
22 argument that these units should be treated differently than steam units.

1 Ex. No. PAS-1A (Prepared Responsive Testimony of Steven Endo) 8:6-
2 10:11.

3

4 **Q. HAS THE ISO INCORPORATED THESE PROPOSED REVISIONS IN**
5 **ITS MOST RECENT CALCULATION OF THE MITIGATED PRICES?**

6 A. No. None of the proposed changes were incorporated into the calculation
7 of the mitigated prices that were submitted along with the Supplemental
8 Direct Testimony of Dr. Eric Hildebrandt on January 10, 2001.

9

10 **Q. WHAT IS YOUR RECOMMENDATION REGARDING THE**
11 **INCORPORATION OF THESE CHANGES INTO THE CALCULATION**
12 **OF REVISED MITIGATED PRICES?**

13 A. I believe that parties should be encouraged to enter into joint stipulations
14 on proposed changes to the previously submitted heat rate data. In
15 instances where joint stipulations cannot be reached, I recommend that
16 the Commission provide direction on what revisions should be
17 incorporated into the calculation of mitigated prices. At this time, the ISO
18 does not have sufficient information to make a recommendation regarding
19 which of the proposed changes should be incorporated.

20

21

22

23

1 III. CALCULATION OF GAS COSTS

2

3 **Q. PLEASE EXPLAIN YOUR UNDERSTANDING OF CRITICISMS OF THE**
4 **DAILY SPOT MARKET GAS COSTS DEVELOPED BY THE ISO FOR**
5 **USE IN THE FUEL COST CALCULATION?**

6 A. Two primary criticisms have been made. First, some of the witnesses
7 have suggested that the ISO's calculations are inconsistent with the
8 Commission's direction on how gas proxy costs should be calculated.
9 Second, some witnesses have also suggested that the gas costs used by
10 the ISO do not reflect the costs incurred by generators selling to the ISO in
11 real-time.

12 Specifically, testifying on behalf of the Competitive Supplier Group,
13 Dr. Cicchetti has argued that the ISO miscalculated the natural gas prices.
14 Instead of using the average of the midpoints of published indices, Dr.
15 Cicchetti has suggested that the ISO should have used "a simple average
16 of the peak marginal natural gas price." Ex. No. SEL-1 (Prepared
17 Responsive Testimony of Charles Cicchetti) at 72:21-22. Dr. Cicchetti
18 claims that the ISO's methodology is inconsistent with Commission
19 direction and does not reflect "the true spot or marginal natural gas prices
20 that should be used for the MMCPs calculated in this time period [the
21 critical December 2000 time period]." Ex. No. SEL-1 (Cicchetti) at 51:4-7

22 Dr. Scott T. Jones has indicated that he "generally agrees with [Dr.
23 Cicchetti's] interpretation." Ex. No. PPL-1 (Prepared Responsive

1 Testimony of Dr. Scott T. Jones) at 22:15-23:5. He also argues that the
2 use of the simple average natural gas price to calculate the mitigated price
3 “is unreasonable” in that it does not reflect the costs incurred for acquiring
4 spot gas supplies for the ISO’s very short-term electricity demand. Ex.
5 No. PPL-1 (Jones) at 23:8-14.

6

7 **Q. DO YOU AGREE WITH DR. CICHETTI’S INTERPRETATION OF THE**
8 **DIRECTION PROVIDED BY THE COMMISSION REGARDING THE**
9 **DEVELOPMENT OF THE DAILY SPOT MARKET GAS COSTS?**

10 A. No. As noted by Dr. Cicchetti and Dr. Jones, Ex. No. SEL-1 at 49:4-6; Ex.
11 No. PPL-1 at 22:15-23:5, the calculation of gas prices was addressed by
12 the Commission in the July 25 Order. In that order, the Commission
13 adopted the Chief Judge’s recommendation, as set forth in his July 12
14 Report and Recommendation, with one modification. As noted by the
15 Commission in the July 25 Order, the Chief Judge’s recommendation was
16 “to use daily spot gas prices and the three delivery points as reported by
17 Financial Times Energy’s “Gas Daily.” 96 FERC ¶ 61,120 at 61,518. In
18 the Chief Judge’s Report and Recommendation to the Commission, Chief
19 Judge Wagner specifically stated that “The daily spot gas prices should be
20 for the ‘midpoint’ as published in Financial Times Energy’s “Gas Daily”
21 publication for the aforementioned delivery points.” 96 FERC ¶ 63,007 at
22 65,040. The one modification made by the Commission to the Chief
23 Judge’s recommendation was to require the use of multiple sources, if

1 available. Specifically, the Commission stated that “the gas inputs
2 recommended by the Chief Judge should be based on the simple average
3 daily spot price as reported by Gas Daily, NGI’s Daily Gas Price Index and
4 Inside FERC’s Gas Market Report.” 96 FERC ¶ 61,120 at 61,518.

5 Dr. Cicchetti claims that the Commission did not accept the Chief
6 Judge’s recommendation that the midpoint index be used. I agree with Dr.
7 Cicchetti that the Commission did not explicitly address the issue of the
8 midpoint index in the July 25 Order. However, I disagree with Dr.
9 Cicchetti’s conclusion that the Commission intended to modify the Chief
10 Judge’s recommendation with respect to using the midpoint index. The
11 Commission indicated that it was accepting the Chief Judge’s
12 recommendation with *one* modification made as a result of comments
13 from Intelligence Press urging that multiple sources of published market
14 prices should be used when available. There is no indication that the
15 Commission intended to modify the Chief Judge’s recommendation that
16 “daily spot gas prices should be for the ‘midpoint.’” 96 FERC ¶ 63,007 at
17 65,040.

18

19 **Q. DO YOU AGREE WITH DR. CICHETTI’S CLAIM THAT THE GAS**
20 **PRICES USED BY THE ISO DO NOT REFLECT THE TRUE SPOT OR**
21 **MARGINAL NATURAL GAS PRICES THAT SHOULD BE USED?**

22 A. No. I believe that the midpoint of the range of spot prices, as used by the
23 ISO, is likely to be more reflective of the prices for natural gas faced by the

1 participants in the ISO's markets over the entire refund period than the
2 reported high price. I do not have any information, however, on the
3 specific costs of natural gas that were incurred by the participants in these
4 markets. Dr. Cicchetti and Dr. Jones have both claimed that the gas
5 prices used by the ISO do not reflect the costs incurred by those selling to
6 the ISO in real-time, but neither witness has provided any evidence to
7 support his claim. Common sense would lead one to conclude the while
8 some gas transactions may have occurred at the high index price, not all
9 gas transactions would have done so. Furthermore, it is unlikely that the
10 marginal resource would have always purchased gas at the high price.
11 Some of the marginal units may have purchased at the low gas index
12 price. As a result, the midpoint index price represents a reasonable proxy
13 spot gas price.
14

1 **SECTION IV: QUANTITATIVE ANALYSIS OF COMMISSION DATA**

2
3 **Q. DO YOU AGREE WITH DR. CICHETTI'S QUANTITATIVE ANALYSIS**
4 **AND CONCLUSION AS PRESENTED IN HIS SUPPLEMENTAL**
5 **TESTIMONY CONCERNING THE HEAT RATE FOR THE**
6 **INCREMENTAL GENERATING UNIT THAT WAS SUPPLYING ENERGY**
7 **TO THE ISO DURING THE LAST FULL HOUR OF A STAGE 1**
8 **EMERGENCY?**

9 A. No. In his supplemental testimony, Dr. Cicchetti states that he has
10 discovered "quantitative support" that demonstrates that his methodology
11 "used in picking the unit with the highest heat rate actually dispatched to
12 generate MWHs in the CAISO's real time market for instructed energy is
13 consistent with the Commission's December 19th order," Ex. No. SEL-11
14 (Cicchetti) at 11:18-20, and that "the methodology used by the CAISO,
15 based upon acknowledged, but not necessarily dispatched, incremental
16 and decremental bids, is completely at odds with the approach that the
17 Commission directed be used in its December 19th Order." Ex. No. SEL-
18 11 (Cicchetti) at 11:21-12:2. He bases these conclusions on a flawed
19 analysis that attempts to show that the heat rates that set the prospective
20 mitigated price limit of \$108 established on May 31, 2001, as referenced
21 by the Commission in the December 19th Order, do not correlate to the
22 marginal heat rates used by the ISO for May 31, 2001 for the refund
23 process.

1
2 The fact of the matter is that the \$108 mitigated price correlates directly to
3 the marginal heat rates determined by the ISO. The \$108 prospective
4 mitigated price is calculated based on the last full-clock hour that the ISO
5 was in a Stage 1 (not Stage 2 or 3) Emergency, in this case the hour
6 starting at 0900 and ending at 1000 (HE10) on May 31, 2001. However,
7 Dr. Cicchetti erroneously bases his analysis on heat rates from *two* hours,
8 HE9 and HE10. Table 1 shows how the \$108 average mitigated price
9 can be calculated for this hour using the ISO's marginal heat rates. That
10 price is calculated as the volume weighted average of the six interval
11 prices during that hour, including residual energy.¹ Similarly, the weighted
12 average marginal heat rate can be calculated based on the heat rates
13 determined by the ISO for the six intervals of HE10 on May 31, 2001. For
14 this hour the incremental marginal heat rates ranged from 10,876 Btu/kWh
15 in interval 1 to 20,655 Btu/kWh in interval 6, which yield an average heat
16 rate of 15,848 Btu/kWh. This closely correlates with the 15,360 Btu/kWh
17 referenced by the Commission as being associated with the \$108
18 mitigated clearing price limit.² Therefore, I conclude that instead of

¹ Residual energy is a result of an instruction in the previous hour that is not continued in the current hour. However, due to ramping residual energy is delivered in the current hour. Residual energy delivered in the current hour is included in the Hourly Ex-post calculation.

² The marginal heat rates I use here for calculating the average heat rate for HE 10 on May 31, 2001 are the same heat rates as used by the ISO for calculating the mitigated price in the refund proceeding. This heat rate data may have been updated, and thus slightly different than the heat rate data available on the operating day of May 31, 2001, when the \$108 Hourly Ex-post price was originally established. The heat rate referenced by the Commission was directly calculated based on the Hourly Ex-post price of \$108, a

1 supporting Dr. Cicchetti's criticisms of the ISO's methodology, this
2 example actually demonstrates that the ISO's calculation of mitigated
3 prices for the refund period is consistent with the Commission's intent.

4

5 **Table 1: May 31, 2001, Hour Ending 10, Hourly Ex-Post Price and Average**

6

Marginal Heat Rate.

Interval	Inc MCP	Dec MCP	Instructed Energy (Mwh)	Residual Energy (Mwh)	Residual Price	Total Energy	Energy Cost	Marginal Unit	Heat Rate (Btu/kwh)	Heat Rate x Total Energy
1	66.51	66.51	28.13	10.16	187	38.29	3770.87	ETIWND_7_UNIT 2	10,876	416457.7
2	66.63	66.63	47.06	0.00	0.00	47.06	3135.71	ETIWND_7_UNIT 2	10,876	511843.9
3	72.23	72.23	55.08	0.00	0.00	55.08	3978.68	CWATER_7_UNIT 2	10,925	601752.9
4	91.45	91.45	86.38	0.00	0.00	86.38	7899.82	GOLETA_6_ELLWOD	13,470	1163538.6
5	111.07	111.07	139.5	0.00	0.00	139.5	15494.96	KEARNY_7_KY3	16,424	2291215.0
6	139.17	139.17	170.75	0.00	0.00	170.75	23763.25	GOLETA_6_GAVOTA	20,655	3526841.3
					Total	537.06	58043.28		Total	8511649.3
						Hourly Ex Post	108.08		Avg. Heat Rate	15848.6

7

8 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

9 A. Yes.

gas price of \$6.641/MMBtu and a \$6 adder as follows: 15,360 Btu/kWh = [(\$108 - \$6 adder) x 1000]/\$6.641/MMBtu.