

REVISED

REDACTED VERSION

BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON

UM 1002

WAH CHANG,

Petitioner,

v.

PACIFICORP,

Respondent.

Supplemental Reply Testimony

Of Charles J. Cicchetti, Ph.D. and Jeffrey A. Dubin, Ph.D.

Pacific Economics Group L.L.C.

on behalf of

PacifiCorp

1 SUPPLEMENTAL TESTIMONY

2 *Introduction*

3 Q. Please state your name, business and address.

4 A. My name is Charles J. Cicchetti. My address is Pacific Economics Group, 301 South
5 Lake Street, Suite 330, Pasadena, California 91101.

6 Q. Did you previously offer testimony in this proceeding?

7 A. Yes, my reply testimony on behalf of PacifiCorp is identified as Exhibit PacifiCorp/23.

8 Q. Please state your name, business and address.

9 A. My name is Jeffrey A. Dubin. My address is Pacific Economics Group, 301 South Lake
10 Street, Suite 330, Pasadena, California 91101.

11 Q. Mr. Dubin, please describe your educational background, professional experience,
12 publications and previous experience as a witness.

13 A. My current curriculum vita, which is provided as Exhibit PacifiCorp/34, includes this
14 information.

15 Q. What is the purpose of this supplemental testimony?

16 A. Our supplemental testimony addresses a statistical study of PacifiCorp's transaction
17 reports to Dow Jones conducted by Wah Chang witness Howard, as presented on pages
18 13-16 of Mr. Howard's rebuttal testimony and his Exhibit WC/1203.

19 Q. Please describe your understanding of the study presented in Mr. Howard's rebuttal
20 testimony.

21 A. During its final two years, the MESA between PacifiCorp and Wah Chang was based on
22 the Dow Jones COB Index prices. Mr. McCullough has alleged that PacifiCorp engaged
23 in various non-transmission buy/resell transactions. Assuming that Mr. McCullough's
24 assertions are accurate, Mr. Howard purports to show that on the days PacifiCorp
25 allegedly engaged in non-transmission buy/resells at COB, "PacifiCorp's reports to Dow
26 Jones of sales transactions caused the Dow COB firm on-peak and firm off-peak indexes

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Q. What "results" can be reached from Mr. Howard's study?

A. When Mr. Howard's methodological flaws are corrected, there is no statistically significant difference in the Dow Jones COB Index price when PacifiCorp's transactions are removed from the Dow Jones COB Index. Thus, Mr. Howard's analysis fails to demonstrate that PacifiCorp's buy/resell transactions had any effect on the Dow Jones COB Index and the prices Wah Chang paid for the final two years under the MESA.

Q. Please list the errors in Mr. Howard's approach.

A. Mr. Howard's study suffers from the following flaws:

- Faulty premise.
- Fundamental design flaws.
- Inexplicable exclusion of data from his analysis.
- Disregard of relevant facts from his analysis.
- Use of false and biased logic to combine peak and off-peak effects.
- Failure to perform statistical analyses that would reveal the flaws in his "combined" effect method.

Faulty Premise

Q. Why do you say that Mr. Howard's study suffers from a faulty premise?

A. There is a disconnect in Mr. Howard's analysis because neither he nor Mr. McCullough offer any evidence that PacifiCorp reported any of these alleged buy/resell transactions to Dow Jones. Indeed, such buy/resell trades would typically not meet Dow Jones' definition of Firm Price transactions. Further, there is no evidence that these particular

⁵ *Order Denying Rehearing*, 106 FERC ¶61,020 (January 22, 2004).

1 PacifiCorp trades in real time world affect the Firm Peak and Off-Peak price indices that
2 determine the price that Wah Chang paid PacifiCorp under the MESA.

3 **Q. What types of transactions were reported to Dow Jones?**

4 A. In fact, there is very little reason to think that any buy/resell transactions would be
5 included in the transactions that PacifiCorp or any other participant reported to the Firm
6 Dow Jones COB Index. In Dr. Cicchetti's Reply Testimony at pages 10-11, he discussed
7 the Dow Jones requirements for transactions to be included in calculating the Firm COB
8 Price Index. It is worth restating how Dow Jones describes the process.

9 The firm indexes average together blocks of power sold on a one-
10 day forward pre scheduled basis. No real-time power is included
11 in these indexes. Transactions are limited to power traded in 16-
12 hour blocks during on-peak hours and 8-hour blocks for off-peak.
13 Transactions which call for delivery for more than one day are not
14 included in calculations for these indexes except for the standard
15 multi-day trading that occurs as a result of schedulers' conferences
16 of month end trading is also included. Trading must follow the
17 standard WSPP schedule. Volume is reported as total megawatts
18 (MW) transacted per hour.

19 Dow Jones defines Firm as financially firm backed with liquidating damages or
20 physically firm. Buy/resell transactions typically do not fit the various specific
21 parameters of the requirements for a Firm Dow Jones COB transaction. Buy/resells tend
22 not to be for standard 16-hour blocks of Peak power or 8-hour blocks of Off-Peak power
23 and the MWs traded are often "odd" sized amounts and likely are real time, not day
24 ahead.

25 **Q. Did you investigate to determine whether the buy/resell transactions identified by
26 Mr. McCullough were reported to Dow Jones?**

27 A. Yes. We reviewed the Buy/Sell Transactions found in Mr. McCullough's spreadsheet
28 entitled "PacifiCorp's buy/resells with Enron at Malin" that were produced in response to
29 PacifiCorp Data Request No. 83. These are the transactions that Mr. Howard used to
30 determine if PacifiCorp's buy/resell transactions affected daily COB prices on days with
31 buy/resells. We compared these buy/resell transactions to the transactions that

1 PacifiCorp reported to Dow Jones, which Mr. Howard used in his analysis. None of the
2 buy/resell transactions Mr. Howard used, which are contained in Mr. McCullough's
3 spreadsheet of alleged buy/resell transactions, appear in Mr. Howard's database of
4 reported PacifiCorp's transactions to Dow Jones. This confirms our expectation that
5 buy/resell transactions are not the types of trades reported in the Dow Jones firm price
6 indices, which are the prices used in the Wah Chang contract. This means that Mr.
7 Howard's analyses can offer only minimal insight as to what else may have been
8 correlated on various days. No one can use his analyses to claim any particular or
9 meaningful causality.

10 Since PacifiCorp did not report any of the alleged buy/resell Transactions to Dow
11 Jones, none of these transactions would have been used by Dow Jones to calculate its
12 Firm Daily Index Price at COB. Therefore, none of PacifiCorp's alleged buy/resell
13 transactions would have had any effect on the Dow Jones Daily Firm COB Index prices.
14 Consequently, Mr. Howard could do no more than calculate the difference in the Dow
15 Jones Index Price with and without all PacifiCorp's trades on the 84 days that PacifiCorp,
16 according to Mr. McCullough, also engaged in non-transmission buy/resell transactions.
17 Moreover, despite this fatal flaw, after closer scrutiny, Mr. Howard's analysis fails to
18 prove that PacifiCorp's alleged buy/resell transactions had a statistically reliable effect
19 on the differences in the Daily Firm Dow Jones COB Index prices or the price Wah
20 Chang paid during the last two years of its contract.

21 *Fundamental Design Flaws*

22 **Q. Why do you say that Mr. Howard's study has fundamental design flaws?**

23 A. A fundamental flaw in Mr. Howard's statistical analysis is what he does with the
24 PacifiCorp data, particularly on these so-called 84 buy/resell days. Specifically, he
25 removes the effect on the Dow Jones price indices of *all* the PacifiCorp trades on
26 these 84 days. Most of these PacifiCorp reported trades at COB likely have nothing

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1 COB markets in the prior month would be averaged to determine the price Wah Chang
2 paid PacifiCorp.

3 Mr. Howard does not stop deleting days. He also, as stated previously, eliminates
4 4 days that he "eye-balls" as outliers. Thus, he reduces the number of observations to 345
5 "effect days" out of 731 days. His deletion of the 4 outliers is unusual. He provides no
6 details as to why objective reviewers would do this. He does not explain the effect of this
7 deletion and/or when these days may fall. Eliminating 4 days in his sub-sample,
8 particularly when he draws inferences related to events (*i.e.* buy/resells) on a small
9 number (84) of buy/resell days (about 11 percent of the 731 days during the two years),
10 can affect both his t-statistics and price differences.

11 He also analyzes Sundays and holidays, which are included in the definition as
12 Sundays, somewhat uniquely. Four "no price effect" data anomalies occur on Sunday.
13 This suggests some need to interpret any Sunday results with suspicion because there are
14 relatively few Sundays in the PacifiCorp trading day sub-sample. Another COB data
15 anomaly was a day that PacifiCorp reported trades at COB during peak hours and Dow
16 Jones reported no trades.

17 **Q. Please illustrate with an example.**

18 **A.** Suppose Company A traded at COB and, on one day, Company A purchased electricity
19 for \$200 per MWh and all the other MWhs sold at COB that day traded at \$100 per
20 MWh. Also assume that on every other day over a two-year period Company A either
21 did not purchase any MWhs or purchased MWhs at a price equal to the COB index prices
22 for that day. An objective observer interested in the effect on COB index prices "with"
23 and "without" Company A's trades might say the following:

- 24 • On 14% of the days (1 out of 731), Company A raised the COB index price.
- 25 • On all other (99.86%) days, Company A's trades and non-trades did *not* affect the
26 COB price.

1 This analysis does *not* answer the question about Company A if someone is instead
2 interested in learning how Company A caused prices to vary at COB over a two-year
3 period. Quite obviously, there is *no* effect, and all 731 days matter. Mr. Howard
4 eliminates both the PacifiCorp non-trading "no effect" days (371 days) and the 11 "no
5 effect" days that PacifiCorp reported trades at COB. In effect, he considers only 345
6 days during the two years, or 47.2% of the trades (345/731). This is like discussing
7 Company A's one-day price effect. Mr. Howard's evidence depends upon two things: (1)
8 The reader and analysts need to be fully aware of what is being said about the sub-sample
9 of included days versus all the days; and (2) the question framed needs to be useful for
10 the regulatory matter under review. Here, it is not because *every day* matters in
11 determining the prices that Wah Chang paid under the MESA with PacifiCorp.

12 *Disregard of Relevant Facts*

13 **Q. In what way does Mr. Howard disregard relevant facts from his study?**

14 A. Two particular points are worth mention: (1) the circumstances surrounding buy/resell
15 transactions, and (2) the pricing structure under the MESA.

16 **Q. What relevant facts does Mr. Howard disregard with respect to buy/resell
17 transactions?**

18 A. Mr. Howard relies on Mr. McCullough's spreadsheets to identify 84 days that PacifiCorp
19 allegedly engaged in non-transmission buy/resells at COB. Both Mr. Howard and Mr.
20 McCullough seem to know that there are reasonable and legitimate reasons for buy/resell
21 trading. Regardless, there is no attempt to review any possible justification for the
22 buy/resell activity on these 84 days. We can only surmise that Mr. Howard's intention is
23 to imply that all such days have nefarious trading activity. This is an unsupported
24 assumption. Geography, for example, provides an explanation for legitimate buy/resell
25 transactions. A particular electricity supplier may have MWs in one location and load or
26 contract requirements in another. Mr. Howard names his buy/resells as "non-

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1 Mr. McCullough's spreadsheet entitled "PacifiCorp's Buy/Resells with Enron at
2 Malin" and the trading transcripts⁶ that Mr. McCullough attaches to his evidence, which
3 are summarized in the workpapers, show that agreements to buy/resell have several
4 important characteristics:

- 5 • Most buy/resells traded at *below* the prevailing spot market prices;
- 6 • Most buy/resells were for very *small* volumes and short durations;
- 7 • Such trades would not represent "blocks" of power and, as stated above, would not be
8 reported to Dow Jones by PacifiCorp.

9 **Q. What additional relevant fact does Mr. Howard disregard with respect to the**
10 **pricing structure under the MESA?**

11 A. A second relevant fact that is ignored is the pricing required under the MESA. The
12 MESA between Wah Chang and PacifiCorp had three years of fixed prices or MWh
13 charges and two years of variable monthly prices. These variable monthly prices were
14 based upon the monthly spot market index determined by the daily average of the Dow
15 Jones COB prices during the Billing Period (plus \$11/MWh), weighted by the firm index
16 for Peak hours and by the non-firm index for Non-Peak hours. The contract specifies that
17 the weighted average firm Peak price should be estimated for the non-Sunday 16 Peak
18 daily hours. Similarly, the weighted average of Off-Peak firm prices should be
19 determined for the remaining Off-Peak 8 hours each day, and all day Sunday. These two
20 weighted average monthly prices are combined into a single monthly weighted average
21 price using the percent of Peak and Off-Peak hours in a give month as weights. Mr.
22 Howard analyzed 24 months of daily data in the calendar years 2000 and 2001, which are
23 generally thought to contain the months of the California Energy crisis period. The last
24 16 months of his data are days when Wah Chang would pay a price per MWh based upon

⁶ Exhibit WC/903.

1 the previous month's average daily Peak and Off-Peak Dow Jones COB price indices as
2 described above

3 *Statistical Analysis*

4 **Q. How does Mr. Howard's statistical analysis introduce bias?**

5 A. Mr. Howard combines his data for Peak, Off-Peak, and Sundays into a single two-year
6 effect. This approach introduces an upward bias and ignores the fact that Dow Jones
7 reports separate Peak and Off-Peak firm price indices, and both are individually
8 recognized as such in the Wah Chang contract. Table 1 shows the percent of days in the
9 two years (731 days) on which removing all of PacifiCorp's trades on a given day would
10 affect the daily average price indices for Peak, Off-Peak (non-Sundays), and Sundays.
11 Using the combined effect suggests that PacifiCorp's trading affect COB prices on almost
12 half the days (47.74 percent). In fact, the "effects" are much less frequent when reviewed
13 during the specific time periods in the Wah Chang contract (Peak and Off-Peak non
14 Sundays and all the Sunday and holiday trades Off-Peak). Mr. Howard's method adds
15 more effect days and falsely uses all transactions on any given day to determine a price
16 effect.

TABLE 1
Percent Days that PacifiCorp's Trades Affected
Dow Jones COB Indices

	Average Price Effects	No Price Effect
	Percent	Percent
Peak Index	34.88%	65.12%
Off-Peak Index	20.93%	79.07%
Sundays	2.74%	97.26%
Mr. Howard's Max Effect Logic	47.74%	52.26%

1 Q. Why is it appropriate to break down the "combined effect" used in Mr. Howard's
2 study?

3 A. One important reason to break down Mr. Howard's combined effect is that Dow Jones
4 reports separate daily Peak and Off-Peak indices. In addition, the Wah Chang contract
5 separately considers Peak and Off-Peak monthly COB price indices.

6 Q. What happens when the data are analyzed separately for Peak, Off-Peak, and
7 Sundays?

8 A. Mr. Howard's experimental design and methodology are not neutral. His subjective
9 decisions and choices matter. Table 2(A) shows what happens to Mr. Howard's reported
10 "combined" t-statistic of 2.754, which is based upon 345 observations (omitting his 4
11 outliers) and 84 buy/resell days, when the data is analyzed separately for Peak, Off-Peak,
12 and Sundays.

	Effect/Total	t-statistic	At 95% or More	Price Effect Difference in \$/MWH
Combined	84/345	2.754	Significant	\$0.485
Peak	53/252	1.894	Not Significant	\$0.303
Off-Peak	34/153	1.129	Not Significant	\$0.236
Sundays	7/19	1.985	Significant	\$2.481

13
14 The only individual price category that passes Mr. Howard's preferred statistical
15 significance test is Sunday. These are just 19 observations in his data and the frequency
16 of Sunday anomalies is proportionally greater than the other two categories.

17 Q. What further analysis did you do?

18 A. We replicated Mr. Howard's analysis and the category break-out in Table 2(B) using all
19 the 614 non-Sundays and the 117 Sundays (holidays are coded Sundays) in 2000 and

2001. Using every day is consistent with the contract terms. All the price differences between the between the buy/resell days without PacifiCorp and the non-buy/resells days without PacifiCorp decline sharply. In his response to PacifiCorp's Data Requests, he includes his 4 outliers in this analysis. We also converted the "combined" effect to be consistent with Mr. Howard. Therefore, we used his method, which is based upon the absolute value of the maximum effect.

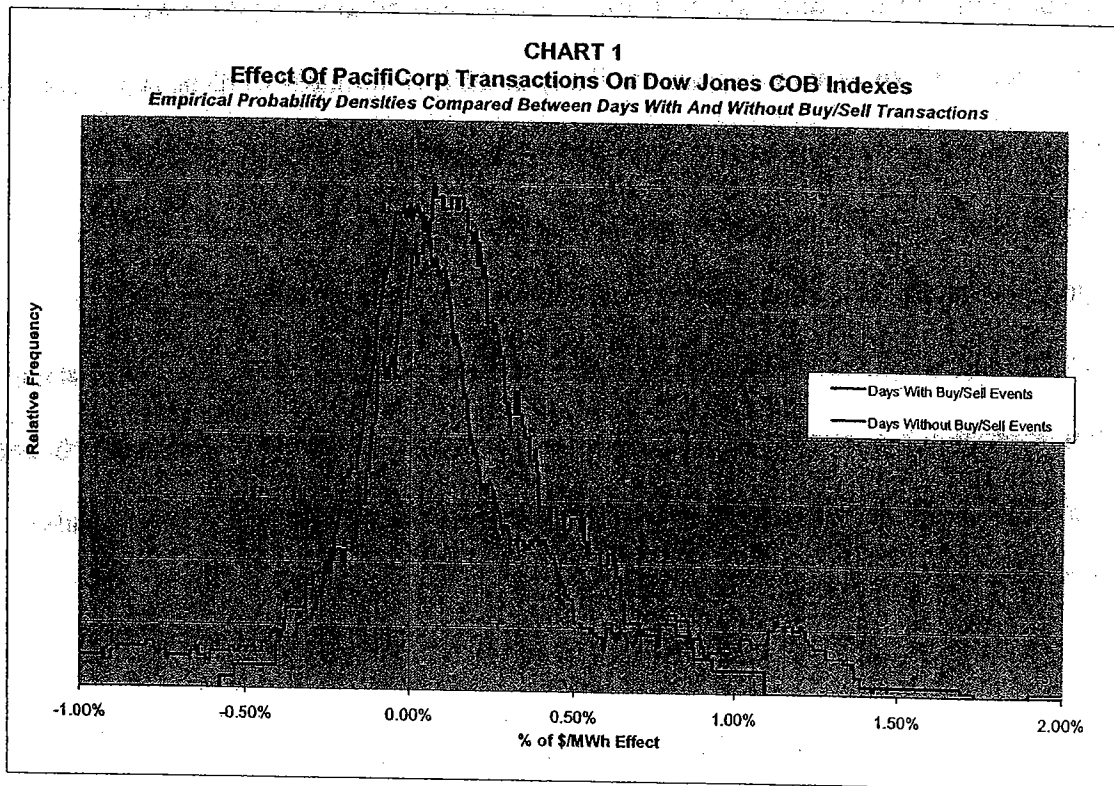
Q. What conclusions do you reach from this analysis?

A. The Peak, Off-Peak, and Sunday price effect differences are not statistically significantly different than zero. The Dow Jones distinguishes between the Firm Peak and Off-Peak categories. The inference to draw is that there is no statistically significant difference in the Peak and Off-Peak categories when they are analyzed individually. The Dow Jones distinguishes between Peak and Off-Peak indices in their reporting. The MESA between Wah Chang and PacifiCorp required individual monthly estimates of Peak and Off-Peak average prices. These are calculated separately and then weighted by their respective percentage of high (Peak) and low (Off-Peak) demand hours in a given month.

	Effect/Total	t-statistic	At 95% or More	Price Effect Difference in \$/MWH
Combined	158/731	2.265	Significant	\$0.240
Peak	138/614	1.820	Not Significant	\$0.126
Off-Peak	138/614	1.113	Not Significant	\$0.059
Sundays	20/117	1.156	Not Significant	\$0.639

1 Q. Did you perform any analysis with respect to the graph shown on page 15 of Mr.
2 Howard's testimony?

3 A. Yes. On page 15 of his Rebuttal Testimony, Mr. Howard included a graph that,
4 according to Mr. Howard, shows that the effects on buy/resell days "are greater and tend
5 to be positive." Mr. Howard responded to Data Request Number 175 with a frequency
6 distribution of the percentage price difference effects related to removing PacifiCorp's
7 trades at COB relative to the prevailing COB prices. He did this per PacifiCorp's request
8 for both the 84 buy/resell days and 261 non-buy/resell days in his 345 day sub-sample.
9 This is shown in Chart 1, which we reproduce from Mr. Howard's response after
10 correcting his mislabeling of the horizontal axis.



1 Q. What does Chart 1 show?

2 A. Chart 1 shows the price differential effect on the COB index using Mr. Howard's
3 questionable combined method and removing PacifiCorp's trades. We do not accept Mr.
4 Howard's combined effect methodology. Nevertheless, we show this chart because it
5 demonstrates that his alleged effects would be very small arithmetically. This is true for
6 both per unit and percentage terms. These differentials fall mostly well with plus or
7 minus one half of one percent (+0.5% to -0.5%) of the prevailing COB prices on any
8 given day. This means that for a \$100 per MWh average daily price, the price differential
9 effect of removing PacifiCorp on the COB index and using Mr. Howard's questionable
10 combined method would be scarcely noticeable. At the extremes, the effect would be on
11 the order of plus or minus fifty cents (or a range of \$99.50 to \$100.50 per MWh on a
12 \$100 per MWh transaction), and probably much less. If the daily COB price was \$30 per
13 MWh, the corresponding extreme range would be \$29.85 to \$30.15 per MWh.

14 Q. What other analyses did you perform?

15 A. Mr. Howard also combines both the negative and positive effects into a single
16 "Combined" effect. We performed a logit regression analysis to expand his analysis to
17 test separately for any positive or negative effect days, as well as to distinguish between
18 Peak, Off-Peak, and Combined effects. During the 731 days, the PacifiCorp daily
19 "effects" at COB were as follows:

TABLE 3
Frequency of Effects

Price Effects	Days	Percentages
No Effect	382	52.26%
Negative	123	16.83%
Positive	226	30.92%
Total	731	100.0%

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We also used the logit regression approach to include some omitted variables that this case and knowledge of the crises would suggest are reasonable to include. We did not do this to be picayune. Omitting relevant variables will cause statistical bias in the results.

Q. What did your analyses of possible omitted variables show?

A. Table 4 summarizes the various logit models that we consider. These reflect the addition of two omitted variables: (1) California Stage 3 Emergency Declarations, because Mr. McCullough observes in his Testimony that such days would trigger the CAISO to make Out-of-Market (OOM) purchases that could trigger buy/resell activity; and (2) California temperature-related data to reflect peak demand conditions in the west. We included Mr. Howard's outlier days. Therefore, there are 731 days in this analysis. The California variables reduced the number of observations, however.

TABLE 4
Logit Analyses to Determine if Negative, Positive, and Either (Binary) Effect Days Are Different Than No Effect (Zero) Days "Combined Effect"

Experiment	Negative (t-statistics/Results)	Positive (t-statistics/Results)	Binary Either
1. Just PacifiCorp Buy/Resell Variable	-1.59/Reject	3.00/Accept	-1.54/Reject
2. Add State 3 Emergency Days	-1.67/Reject	1.58/Reject	-0.45/Reject
3. Add L.A. High Daily Temperature	-1.53/Reject	1.64/Reject	-0.56/Reject

14

1 The column labeled "negative" examines the days when removing PacifiCorp's
2 transactions, typically firm sales at COB, would cause the Firm COB index prices to
3 decline. The dependent variable in the logit shown in Table 4 reflects Mr. Howard's
4 combined Peak, Off-Peak, and Sunday concept.

5 The t-statistics shown are for the independent variable that designates an alleged
6 buy/resell day. Experiments 2 and 3 show the effect on the reported t-statistic for
7 buy/resell days when the respective omitted variable is included in the logit analyses.

8 The "positive" column shows a similar t-test on the buy/resell days for the
9 likelihood that PacifiCorp's reported Dow Jones trades would cause the "combined" COB
10 index price to increase. The "Binary" column shows the same information for the
11 likelihood of PacifiCorp's reported Dow Jones COB trades to change the index (plus or
12 minus).

13 Table 4 shows the only experiment with a statistically significant effect is the
14 "positive" price difference when the only included explanatory variable is a variable
15 designating days on which Mr. McCullough's spread sheet shows that a PacifiCorp
16 buy/resell trade occurred. Adding California emergency days (when Mr. McCullough
17 expects buy/resells could trigger OOM transactions) or California temperature causes this
18 alleged positive effect to become statistically insignificant. Therefore, no statistical
19 significance should attach to Mr. Howard's conclusions.

20 Table 5 shows the same logit experiments for just the days when the effect of
21 removing PacifiCorp trades would cause the Dow Jones Firm COB Peak Index to change.
22 None of the "positive" or "either" price effects are statistically significant than zero across
23 all four experiments. All the negative day effects are significant. This means that

1 removing PacifiCorp's reported trades reduces the likelihood of negative" price declines
2 when PacifiCorp has buy/resells.

TABLE 5
Logit Analyses to Determine if Positive, Negative, and Either (Binary) Peak Days Are Different Than No Effect (Zero) Days "Peak Effect"

Experiment	Negative	Positive (t-statistics/Results)	Binary Either
1. Just PacifiCorp Buy/Resell Variable	-2.89/Accept	0.72/Reject	0.83/Reject
2. Add State 3 Emergency Days	-2.86/Accept	0.34/Reject	1.12/Reject
3. Add L.A. High Daily Temperature	-2.60/Accept	0.59/Reject	0.73/Reject

3
4 Table 6 shows that none of the likelihood of changes in the Off-Peak effects at
5 COB are statistically different than zero when PacifiCorp's trades are removed. This
6 result does not change across the three experiments shown in Table 6. We did not do a
7 separate analysis of Sundays given the small number of days with buy/resell transactions
8 and the anomalies we discussed previously.

TABLE 6
Logit Analyses to Determine if Positive, Negative, and Either (Binary) Off-Peak Days Are Different Than No Effect (Zero) Days "Off-Peak Effect"

Experiment	Negative	Positive (t-statistics/Results)	Binary Either
1. Just PacifiCorp Buy/Resell Variable	-1.41/Reject	1.07/Reject	0.09/Reject
2. Add State 3 Emergency Days	-1.15/Reject	1.39/Reject	-0.31/Reject
3. Add L.A. High Daily Temperature	-1.50/Reject	1.33/Reject	-0.04/Reject

9
10 **Conclusion**

11 **Q. Please summarize your conclusions.**

12 **A.** The relative price effects related to removing PacifiCorp's trades at COB using Mr.
13 Howard's sub-sample are small. These small effects shrink further when *all* the days in

1 the two-year period are included because the contract used every day to establish Wah
2 Chang's monthly contract price.

3 We also abandoned Mr. Howard's questionable composite daily price effect and
4 replaced his approach with the Peak and Off-Peak price indices. Using his sub-sample of
5 just "effect" days, both the Peak and Off-Peak price differentials are not statistically
6 significantly different from zero. We also considered all 731 days because the contract
7 would use every day and because, with virtually no justification, Mr. Howard eliminated
8 74 "no-effect" buy/resell days when he formed his sub-sample. We found that the
9 resulting very small price differentials using Peak hours and Off-Peak hours were not
10 significantly statistically different from zero.

11 There are logical flaws and methodological flaws that make Mr. Howard's results
12 biased and meaningless. There is no proof that PacifiCorp, a net buyer that purchased
13 30 percent of its native load requirements, either intentionally or accidentally caused
14 COB Peak and Off-Peak price indices to increase due to its trading activity: (1) on
15 buy/resell days; (2) as a result of only buy/resell transactions; or (3) in any meaningful
16 manner.

17 **Q. Does this conclude your supplemental testimony?**

18 **A. Yes.**

BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

UM 1002

WAH CHANG,

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PACIFICORP,

Respondent.

CERTIFICATE OF SERVICE

I certify that I have this day served PacifiCorp's Revised Exhibit PacifiCorp/33 Supplemental Reply Testimony of Charles J. Cicchetti, Ph.D. and Jeffrey A. Dubin, Ph.D. replacing Exhibit PacifiCorp/33, upon all parties of record in this proceeding by hand delivery pursuant to OAR 860-013-0070, to the following parties or attorneys of parties:

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