Docket UM 1002
Wah Chang Exhibit 1204

BEFORE THE PUBLIC UTILITY COMMISSION OF THE STATE OF OREGON

WAH CHANG

Sur-Surrebuttal Testimony of Berne Martin Howard and Robert McCullough

August 7, 2007

SUR-SURREBUTTAL TESTIMONY OF BERNE MARTIN HOWARD AND ROBERT MCCULLOUGH

I. INTRODUCTION

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

A. My name is Berne Martin Howard. I am the sole member of Bench Mark Heuristics, LLC, an electric power industry policy and economics consulting firm. My business address is 1910 NE 67th Avenue, Portland, Oregon 97213.

Q. Did you previously offer testimony in this proceeding?

A. Yes, my rebuttal testimony on behalf of Wah Chang is identified as Exhibit Wah Chang/1200. As noted in that testimony, I also testified on behalf of Wah Chang in this proceeding in 2001.

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

A. My name is Robert McCullough. I am the principal of McCullough Research, an energy consulting firm specializing in bulk power issues. My business address is 6123 SE Reed College Place, Portland, Oregon 97202.

Q. Did you previously offer testimony in this proceeding?

A. Yes, my direct testimony on behalf of Wah Chang is identified as Exhibit Wah Chang 800, and my rebuttal testimony on behalf of Wah Chang is identified as Exhibit Wah Chang 869. I also testified on behalf of Wah Chang in this proceeding in 2001.

Q. What is the purpose of this sur-surrebuttal testimony?

A. The purpose is to comment on certain aspects of the Supplemental Reply Testimony of Charles J. Cicchetti, Ph.D. and Jeffrey A. Dubin, Ph.D., filed on behalf of PacifiCorp, and identified as PacifiCorp Exhibit 33. The testimony of Dr. Cicchetti and Dr. Dubin was filed after the Administrative Law Judge granted PacifiCorp's motion for leave to file surrebuttal testimony responding to Mr. Howard's study concerning the Dow COB index effects of PacifiCorp's transaction reports to Dow Jones.

Q. What aspects of Drs. Cicchetti and Dubin's testimony will you comment on?

A. On pages 2-4, they purport to identify five ways in which Mr. Howard's study is "fundamentally flawed." On page 7, they basically repeat this listing of "errors" and expand on them in the remainder of their testimony. Our current testimony will show that most of these "errors" reflect a misunderstanding or mischaracterization of Mr. Howard's study. They attack a straw man. Our testimony will also address their other criticisms of Mr. Howard's study.

II. "<u>FAULTY PREMISE" AND "DESIGN FLAW</u>"

Q. On page 2, Dr. Cicchetti and Dr. Dubin state that "the underlying premise of Mr. Howard's analysis is lacking." What underlying premise are they talking about?

A. Our understanding is that they believe the "underlying premise" of Mr. Howard's study is that PacifiCorp reported the non-transmission buy/resells to Dow Jones.

Q. Is that a premise of Mr. Howard's study?

A. No, and there is no reason Drs. Cicchetti and Dubin should have thought it is. As Mr. Howard pointed out in his testimony, most non-transmission buy/resells occurred in real-time, whereas Dow reportable transactions are day-ahead. This obviously makes it unlikely that most buy/resells were reported to Dow.

Q. What effect does this have on the conclusion of Mr. Howard's study?

A. None whatsoever. The conclusion was that PacifiCorp's Dow reports had a greater inflating effect on the Dow COB index on days when PacifiCorp engaged in non-transmission buy/resells with Enron than on days when it did not. In other words, there is a statistical association between such "buy/resell days" and higher Dow COB index prices. That such an association exists can be stated with a high degree of statistical confidence. The fact that the buy/resells likely were not reported to Dow Jones does not have a bearing on that conclusion.

Q. On page 2, lines 17-18, Drs. Cicchetti and Dubin state that "the buy/resell transactions would not have had any effect on the Dow Jones COB Index price" because PacifiCorp did not report the buy/resells to Dow Jones. What comment do you have about this statement?

A. The statement itself is "fundamentally flawed" because its "underlying premise" is not proved and is likely wrong. Their premise is that the buy/resells could have affected the index only if they had been reported to Dow Jones, but that is not the case. The short term trading market is a complicated and dynamic system of information flow and highly decentralized decision-making, with many, many traders talking among themselves and making individual price and delivery decisions. During 2000-2001, the markets were particularly chaotic. It was not Mr. Howard's purpose to identify a mechanism or mechanisms by which buy/resells might affect Dow index prices. His purpose was only to determine whether PacifiCorp's reports to Dow Jones on "buy/resells days" might have caused Dow COB index prices to be higher or lower than they would have been without the reports. The particular market dynamics that explain the relationship revealed by his study are not precisely known and may be unknowable given practical constraints of time, money, and information. However, it is almost certainly wrong to assert, as do Drs. Cicchetti and Dubin, that direct reporting of buy/resells to Dow Jones is the only way they could have affected the index.

Q. At page 9, line 22 and continuing, Drs. Cicchetti and Dubin testify that Mr. Howard's study suffers from a fundamental design flaw. What design feature are they talking about?

A. As we understand the testimony, they criticize the study because Mr. Howard removed all PacifiCorp's reported transactions on the buy/resell days when he re-calculated the index price. They seem to be saying that Mr. Howard ought to have removed only the buy/resells themselves. For example, in their summary on page 2, lines 24-26, they state: "Mr. Howard does not simply remove the price effects of the alleged PacifiCorp buy/resell transactions. Instead, he removes all PacifiCorp's reported transactions, which likely were mostly sales at COB."

Q. What comment do you have about this criticism?

A. It is apparent from what we said earlier that this criticism misconceives the study. Mr. Howard did not suppose that PacifiCorp's reports included any buy/resells, and in fact he thought it likely that they did not. But, as explained above, this fact has no bearing on the validity of the conclusion he reached.

III. "<u>INEXPLICABLE" DATA EXCLUSION</u>

Q. On page 5, line 5, Drs. Cicchetti and Dubin identify as a "flaw" Mr. Howard's "[i]nexplicable exclusion of data from his analysis." What are they talking about?

A. They are talking about their own misleading "spin," which they spell out on pages 11-13. The "exclusions" they are talking about are not only explicable, they were in fact explained, but Drs. Cicchetti and Dubin ignored the explanations.

Q. Please explain.

A. Drs. Cicchetti and Dubin note that Mr. Howard did not use data for 382 out of the 731 days during 2000-2001, and they state or imply, at page 11, lines 21-23, that Mr. Howard chose to "eliminate" those 382 days, comprising about 52% of all days during the two year period.

Q. Did Mr. Howard "eliminate" 382 days?

A. No. As Mr. Howard said in his description of the study, WC/1203, page 2, Dow Jones sent PacifiCorp transaction reports for only 405 days, or about 55% of the two year period. He did not "eliminate" data for the other 326 days. He simply did not have it.

There is no reason to think that the unavailable Dow Jones information would affect the validity of the conclusion drawn from the data that was available to Mr. Howard.

Q. Drs. Cicchetti and Dubin state that Mr. Howard "deleted 371 such days because PacifiCorp did not trade on those days." Is that accurate?

A. No. As discussed, Dow Jones for whatever reason did not send data for 326 days. PacifiCorp presumably traded at COB on all or most of those days.

Q. Drs. Cicchetti and Dubin also say, at page 11, lines 17-19, it is "strange[ ]" that "Mr. Howard eliminates 74 days that PacifiCorp made buy/resells at COB with zero effect on the COB index prices using his definition of an effect." What is your comment about this testimony?

A. It is not "strange" at all. On 69 out of those 74 buy/resell days, PacifiCorp reported no transactions at COB, and thus it is obvious and not "strange" that Mr. Howard would not include those days in the study. It is disingenuous and misleading of Dr. Cicchetti and Dr. Dubin to give such testimony because this had been explained to them in response to PacifiCorp's data request no. 181. On the remaining five days, PacifiCorp's reports exactly matched the index and thus were not relevant to the study, which was designed to determine the effect of the reports when they had an effect, as they did on all days for which Mr. Howard had Dow Jones data other than the five.

Q. Drs. Cicchetti and Dubin, at page 12, lines 3-10, characterize Mr. Howard's exclusion of four outliers as "unusual" and state that Mr. Howard "provides no details as to why objective reviewers would do this." Is it "unusual" to throw out outliers?

A. No, it is a common and sound statistical practice. The outliers discarded in this study were more than six standard deviations from the group mean, a deviation so unusual that it would not be expected to be observed even in hundreds of millions of data points. They were so odd that they should not be allowed to influence the analysis because they likely represented some kind of event irrelevant to the question.

Q. Did Drs. Cicchetti and Dubin know Mr. Howard's reasoning about the outliers at the time they wrote their testimony?

A. Yes, in response to a data request, PacifiCorp admitted that Drs. Cicchetti and Dubin had read Mr. Howard's explanation of his reasoning, which was provided in response to PacifiCorp's data request no. 183.

Q. What, then, is the significance of the testimony by Drs. Cicchetti and Dubin that Mr. Howard had simply "eye-balled" the outliers and had "provide[d] no details as to why objective reviewers would do this"?

A. The significance is that Drs. Cicchetti and Dubin again are being disingenuous and misleading.

IV. "<u>DISREGARD OF RELEVANT FACTS</u>"

Q. Drs. Cicchetti and Dubin testify, at page 7, line 16 and page 13, line 13 and continuing, that another "error" by Mr. Howard is "[d]isregard of relevant facts." What "relevant facts" do they claim have been disregarded?

A. One, described at page 13, lines 20-21, is that "Mr. McCullough and Mr. Howard seem to know that there are reasonable and legitimate reasons for buy/resell trading."

Q. Is that a "fact" you "seem to know" and have disregarded?

A. No, it is not a fact at all. The opposite is true: there can be no legitimate purpose for non-transmission buy/resells. Drs. Cicchetti and Dubin state that "[g]eography, for example, provides an explanation for legitimate buy/resell transactions," but non-transmission buy/resells occur at a single location and by their nature cannot facilitate using power at one location to meet requirements at another or "work[ing] around transmission constraints." No electricity is transmitted. Nor can they be used as sleeve or credit-support transaction, in which an intermediary buys from one party and resells to another in order to lend its credit to the ultimate buyer. In the non-transmission buy/resells, there is only a seller-repurchaser and a buyer-reseller, and no intermediary. The only possible purposes of non-transmission buy/resells are illegitimate: to disguise the source of electricity or to create a false appearance of price or volume.

Q. Are there other "relevant facts" that Drs. Cicchetti and Dubin claim you have ignored?

A. Yes, they hypothesize that the buy/resells could not have affected the Dow COB index because real-time transactions occur after the day-ahead transactions reported to Dow Jones, and they mention some characteristics of the buy/resells (page 14, line 20-page 15, line 8).

Q. What is your comment about this reasoning?

A. It is a false construct to say that real-time transactions occur after day-ahead transactions. Both types are constantly occurring in a continuous flow. It is a mere truism that a day-ahead transaction made on day 1 for delivery on day 2 occurs before real-time transactions on day 2, but this tells us nothing about the likelihood that real time transactions affect day-ahead transactions. Both are occurring every day. Similarly, the fact, if it is a fact, that "[m]ost buy/resells traded at below the prevailing spot market price" does not cast doubt on the conclusion of Mr. Howard's study, which is simply that a statistically certain relationship exists between PacifiCorp's reports on buy/resell days and higher index prices. Mr. Howard's study neither presupposes nor purports to show that the buy/resell prices were higher than spot market prices on those days. Indeed, a person could not reasonably expect that they would be higher or lower because the nominal commodity price in a buy/resell is arbitrary—only the spread makes an economic difference. In fact, in April 2001, Bill Williams, an Enron trader supervisor, admonished his traders to record prices when doing buy/resells with PacifiCorp, not just PacifiCorp's charge:

> Group.
> When doing a buy-resale with Pacificorp, we need to agree on the buy and the resale prices on the phone. These prices need to be recorded in your trade log. We also need to now check the prices nightly on buy-resales with Pacificorp when doing the SAR. We are having numerous discrepancies with Pacificorp because of problems with buy-resale deal entry. I have listed to several tapes where only the spread ($10 or $20 dollars) is mentioned. Let's be sure to establish these prices, do the confirms nightly, and make sure we can continue to work closely with this counterparty.

This e-mail is Wah Chang's Exhibit WC/828.

Q: Are there other facts that Drs. Cicchetti and Dubin claim have been ignored?

A: Yes, they mention the MESA peak and off-peak pricing structure, which is addressed in the next section of this testimony.

Q: Are there other facts that they claim have been ignored?

A. Yes, they assert that PacifiCorp purchased about 30% of its native utility load and as a net purchaser would have preferred lower market prices.

Q. What is your response to this point?

A. This argument is not consistent with the facts and shows an unsophisticated understanding of trading. PacifiCorp's FERC Form 1s for 2000 and 2001 show that PacifiCorp was a net seller over this two year period. Moreover, even if PacifiCorp had been a net buyer, that fact would not establish whether it profited or lost from market manipulation. Enron, for example, was a net buyer over the period of the western market crisis and still profited handsomely from its market manipulations.

Q. Why isn't it sufficient to just calculate whether PacifiCorp bought more than they sold over this period?

A. Profits are calculated in dollars, not mega-watt hours. A successful market manipulation that raises prices when a market participant has a long forward position can allow a significant profit even if the seller has to purchase the power on the spot market.

V. "FALSE AND BIASED LOGIC"

Q. Drs. Cicchetti and Dubin state, on page 7, line 17, that one of the flaws in Mr. Howard's study is the "[u]se of false and biased logic to combine peak and off-peak effects." Where in their testimony do they explain what they mean?

A. Their explanation appears at pages 16 through 18.

Q. What aspect of the Howard study are they criticizing?

A. For each day (other than Sundays and holidays) for which Mr. Howard had PacifiCorp's report to Dow Jones, he determined whether the report had an effect on the on-peak index and the off-peak index and the magnitude of the effect. The effect he assigned to that day was the one with the highest absolute value. For example, if on a particular day PacifiCorp's report caused the on-peak index to be $0.50 higher than it would have been without PacifiCorp's report, and caused the off-peak index to be $0.75 lower, Mr. Howard designated that day as one on which the PacifiCorp report caused the index price to be $0.75 lower than it would have been without the report. Drs. Cicchetti and Dubin's testimony is that on-peak hours and off-peak hours ought to be analyzed separately.

Q. Do you agree?

A. No.

Q. Please explain.

A. Drs. Cicchetti and Dubin's suggestion would make sense if we had in hand a substantial collection of buy/resell transactions that were included in PacifiCorp's reports to Dow Jones and if that data were adequately robust to determine a reliable estimate of how those transactions separately affected the on-peak, off-peak, and Sunday index values. It could then be demonstrated whether or not those transactions directly affected the indexes up or down by reason of being included in their calculation. But this kind of analysis is impractical. We simply do not have any PacifiCorp transaction reports to

Dow Jones that we have been able to clearly identify amongst the buy/resell transactions that were identified for use in this analysis. Considerable PacifiCorp transaction data has been provided through Wah Chang's discovery since Mr. Howard's study was designed, and it is conceivable there may be buy/resell transactions among them that were included in PacifiCorp's reports to Dow Jones. However, for the reason previously explained, we do not expect that there would be many such transactions, making reliable statistical analysis of direct influence unlikely.

Q: Of what value is Mr. Howard's study if the buy/resells were not reported to Dow Jones and thus were not included in the computation of the index prices?

A: The true influence that PacifiCorp's buy/resell transactions had on the Dow Jones COB indexes was exerted through the assistance they provided to the execution of Enron's schemes. Drs. Cicchetti and Dubin would have us calculate an exact accounting link between PacifiCorp buy/resell transaction data and dollars paid to PacifiCorp by Wah Chang. However, even if the computation could be designed, and the necessary resources made available to conduct it, a very large amount of transaction data would have to be obtained from a very large number of market participants, who undoubtedly would not be willing to provide it voluntarily. Thus Mr. Howard designed an approach to the available information that would at least give some signal if there was a measurable connection between PacifiCorp's participation in a significant Enron scheme and the influence PacifiCorp's Dow Jones reports had on the index used to price Wah Chang's service. Mr. Howard's study was designed to address that question, as distinguished from the different question Drs. Cicchetti and Dubin seem to think it was designed to answer. The method Mr. Howard chose is appropriate to its purpose and does not "bias" the result.

Q. Why is it appropriate?

A. Again, the question Mr. Howard addressed was, on days that PacifiCorp engaged in buy/resells with Enron, what the effect, if any, did PacifiCorp's reports to Dow Jones have on the index? Selecting the intraday effect with the highest absolute value, positive or negative, best answered that question and did not bias the study, upward or downward. Mr. Howard's procedure was neutral as between positive and negative effects and was just as likely to find a negative difference as a positive difference.

Q. What is the significance of Table 1, on page 16 of their testimony?

A. It purports to show that Mr. Howard's "highest absolute value" rule of choice results in a higher percentage of "effect" days than a separate analysis of peak and off-peak hours.

Q. What comment do you have about Table 1?

A. The problem with Table 1 is that it mistakenly counts as "no effect" days all days for which Dow Jones did not send PacifiCorp's reports. As stated on page 16, line 9, the table is based on 731 days, but Dow Jones sent PacifiCorp's reports only for 405 days. Table 1 is thus based on a gross error. In the absence of the PacifiCorp report for a particular day, Drs. Cicchetti and Dubin cannot know whether the report had an effect on the index. They appear to have simply assumed that it had no effect.

Q. What is the significance of Table 2(A) on page 17 of their testimony?

A. Table 2(A) purports to show that the effects of PacifiCorp's reports are not statistically significant, except for Sundays, when the data are separately sorted for on-peak and off-peak hours.

Q. What comment do you have about Table 2(A)?

A. As discussed, the break-down of the data is unnecessary to answer the question Mr. Howard was studying. It also makes it more difficult to reliably answer that question because the sample sizes are reduced so much. With this in mind, it is interesting to note that Drs. Cicchetti and Dubin ignored their own advice to include both on-peak and off-peak effects on days when both are present. If both effects are included in the analysis for days when both on-peak and off-peak effects occur, the on-peak difference becomes significantly different from zero, with the associated p-value for the t-statistic being 0.047. It is also interesting to note that Table 2(A) agrees with Mr. Howard's study insofar as it shows that the price effect was positive in all cases.

Q. What is the significance of Table 2(B) on page 18 of their testimony?

A. This table appears to be the same as Table 2(A), except that it apparently includes the days for which Dow Jones did not send PacifiCorp's reports.

Q. What is your comment about this table?

A. It suffers from the same defect as Table 1 because it apparently counts as "no effect" days the days for which Dow Jones did not send reports. In the absence of the reports, Drs. Cicchetti and Dubin cannot know that the reported transactions had no effect.

VI. "OMITTED" VARIABLES ANALYSIS

Q. On page 7, lines 18 and 19, Drs. Cicchetti and Dubin identify as a final "flaw" Mr. Howard's "[f]ailure to perform statistical analyses that would reveal the flaws in his 'combined' effect method." What are they talking about here?

A. This refers to the "omitted" variables and logit regressions described on pages 20 through 24 of their testimony.

Q. How do the logit regressions differ from Mr. Howard's analysis?

Mr. Howard's analysis dealt with the differential *magnitude* of the effect of PacifiCorp's reports to Dow Jones on the Dow Jones COB firm indexes. In contrast, the logit regressions of Drs. Cicchetti and Dubin consider the possible differential *probability* of broad categories of effect – increasing, decreasing or none – depending not only on whether the corresponding day coincided with one of the buy/resell transactions identified in Mr. Howard's study, but also depending on two other so-called "omitted variables," the dichotomous occurrence of a day on which a stage 3 emergency was declared, and an apparently continuous measure of high temperatures in Los Angeles.

Q. At page 20, line 16, Drs. Cicchetti and Dubin say that the logit regressions "expand" Mr. Howard's analysis. Do you agree with that characterization?

A. No. In fact, the logit regressions are more limiting in a fundamental way; they discard all information contained in the *magnitude* of the effects that PacifiCorp's reports to Dow Jones had on the firm COB indexes.

Q. Why do the logit regressions discard information?

A. The nature of logit regressions, and these in particular, is to consider how the probability of some simple occurrence is influenced by other variables. In this case, the simple events are a primitive trichotomy; the influence could be positive, negative or absent, for PacifiCorp's influence on the Dow Jones firm COB indexes on a particular day, without regard to the size of those influences. All information about the size of the influences was discarded, leaving only the direction of each price change.

Q. Are there other problems with the logit regressions performed by Drs. Cicchetti and Dubin?

A. Yes. Logit regression, like any other variety of general linear modeling, demands careful thought when adding explanatory variables. In at least one respect, the variables chosen by Drs. Cicchetti and Dubin have a quality that makes interpretation of the result something of a puzzle; the Los Angeles daily high temperature data and the dichotomous stage 3 emergency declaration data are highly dependent. In standard linear regression this is analogous to colinearity amongst the independent variables. There is also considerable dependence between the buy/resell days and the stage 3 emergency indicator, and between the buy/resell days and the L.A. high temperature variable. This means there is considerable dependence among all three. The basic difficulty this property raises is that it confuses which of the independent variables is actually exerting an influence and is prone to lead to a failure of the analysis to detect a real effect that is, in essence, split or shared among the independent variables. This is a classic problem with regression analysis of all kinds and merits very careful treatment. Drs. Cicchetti and Dubin seem to have launched their logit regression without considering these basic issues.

Q. How can we tell if the "omitted" variables are dependent on the buy/resell day indicator variable?

A. The relative frequency of stage 3 emergency days is much greater on non-buy/resell days than on buy/resell days – 30 out of 385 vs. 1 out of 114. This high degree of dependence means that if we know a day is a stage 3 emergency day we can be very sure that it is *not* a buy/resell day; the converse is not so certain, but the dependence is clear. For the L.A. high temperature variable, a simple t-test shows that high temperatures on buy/resell days are significantly different than otherwise, with a p-value of less than .000000004. Curiously, L.A. high temperatures are lower on stage 3 emergency days than otherwise, with the t-test for equal mean temperature regardless of stage 3 emergency declaration having a p-value of less than .000008.

Q. What is the practical implication of the dependence among the independent variables in the logit regressions of Drs. Cicchetti and Dubin?

A. The initial logit regression they conducted showed a significant effect of the buy/resell day indicator variable on the relative likelihood of PacifiCorp's reports to Dow Jones having a positive effect on the Dow Jones firm COB indexes. When they added the other two variables they were, to a large degree, adding the same information provided by the buy/resell variable. As would be expected, the addition of the same information spread across two or even three explanatory variables creates some confusion as to which of the variables has explanatory power for the dependent variable, and thus reduces the ability of the analysis to detect effects.

Q. **Drs. Cicchetti and Dubin conclude, at page 22, line 19, that "no statistical significance should attach to Mr. Howard's conclusions." Do you agree with this**

statement?

A. No. The considerable dependence among the three explanatory variables makes the logit regressions largely ineffective as an analytical tool. Metaphorically, what they have done is put on eyeglasses that make objects appear blurry and concluded that the objects *are* blurry.

Q. How should Drs. Cicchetti and Dubin have handled this problem?

A. In my opinion, the most appropriate action, given the structure of the data, would have been to apply Occam's razor and stick with the initial model having a single independent variable. Metaphorically, they should not have put on the eyeglasses. Drs. Cicchetti and Dubin might have considered using one of the other of their "omitted" variables alone in a logit regression model, but they would then lose any ability to ask questions regarding the relation between the buy/resell day indicator and direction of the effects of PacifiCorp's reports on the Dow Jones firm COB index.

Q. Did Drs. Cicchetti and Dubin have to force the effect data into a categorical form – positive effect, negative effect and no effect – to evaluate the relative influence of all three variables?

A. No. A simple linear regression model would have served to investigate the effects on the actual quantities. Mr. Howard performed such a linear regression using the data provided by PacifiCorp in response to Wah Chang's Data Request No. 218. The relevant standard linear model regresses the daily effects chosen by Mr. Howard's analysis on three variables; buy/resell day indicator, stage 3 emergency declaration day indicator and L.A. high temperature. The result of this regression is that only one of the three variables has a significant t-test p-value, the buy/resell day indicator. The p-value of the t-test for the coefficient for that variable is .029. This regression does not have good overall significance as the associated F statistic p-value is about .12. This is not unexpected because of the collinear-like qualities of the "omitted" variables.

Q. What other observation can you make about these regressions?

A. The data used by Drs. Cicchetti and Dubin, as supplied to Wah Chang in response to Wah Chang's Data Request No. 218, contain numerous missing values for the two "omitted" variables. Out of 731 daily data points, only 499 had values for the two "omitted" variables, and Drs. Cicchetti and Dubin's logit regression apparently did not utilize those data points. This is interesting as they did apparently use a value of zero for the effect variable when there was a missing PacifiCorp report to Dow Jones. If those zero effect days are omitted from the regression, as Mr. Howard believes should be done, and consistent with Drs. Cicchetti and Dubin's practice of omitting days with missing values for some of the variables in the regression, then the significance of the overall regression improves dramatically – the F statistic p-value is much less than .0001 – and both the buy/resell day variable and the stage 3 emergency declaration variable show significant effects. Mr. Howard does not recommend this analysis because of the problems he has identified with the nature of the "omitted" variables, but the formal execution of the simple linear regression analysis does help illustrate some of the difficulties inherent in adding complexity to the statistical models used without careful examination of the characteristics of the data and their practical relation to the questions at hand.

VII. <u>CONCLUSION</u>

Q. Does this conclude your testimony?

A. Yes.