B EFORE THE P UBLIC S ERVICE C OMMISSION OF U TAH

IN THE MATTER OF THE APPLICATION OF PACIFICORP FOR APPROVAL OF AN IRP BASED AVOIDED COST METHODOLOGY FOR QF PROJECTS LARGER THAN 1 MEGAWATT	Docket No. 03-035-14 DPU Exhibit 1.0SR

Surrebuttal Testimony of

Dr. William Powell

Division of Public Utilities

September 19, 2005

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4 **Q: Are you the same Dr. William (Artie) Powell that filed direct testimony on**

5 **behalf of the Division of Public Utilities (Division) in this docket?**

6 A: Yes, I am.

7 **Q: In rebuttal testimony, Wasatch Wind's witness Dr. Collins claims that the**

8 **two reports you cite in direct testimony "negate" your conclusion about the**

9 **calculation and role of imputed debt for purchase power agreements and in**

10 **particular for QF avoided costs. Would you agree with Dr. Collins?**

11 A: Not at all. The Division's recommendation is based on three factors; Dr. Collins

12 only considers one of these factors in making his counter proposal. By only

13 considering one factor, his counter proposal is fatally flawed.

14 **Q: What are those three factors and how did you use them to arrive at your**

15 **recommendation?**

16 A: First is the rating agencies themselves. As I clearly demonstrated in direct

17 testimony (DPU Exhibit 1.0), rating agencies view and treat portions of purchase

18 power agreements (PPA's) as debt-like instruments. This information is reported

19 to investors and is used by the agencies in setting bond ratings for utilities. Thus,

20 this information has the potential of influencing the bond rating of a utility and the

21 willingness of investors to invest in utilities and can therefore affect the cost of

22 capital for the utility. Second, a report from Lawrence Berkeley Laboratory

23   concludes that little or no empirical evidence exists to support the "debt-

24   equivalence hypothesis." This is the report from my direct testimony referred to

25   by Dr. Collins in his rebuttal testimony.[1] Third, as I noted in direct testimony, the

26   Lawrence Berkeley report is based on data predating the California energy crises.

27   Thus, the conclusions contained in the report may no longer be valid.

28   The Division's recommendation was an attempt to balance all three of these

29   factors; Dr. Collins in rebuttal testimony ignores the first and third factors and

30   focuses on the second factor. To re-state our recommendation, the imputed costs

31   should be reflected in the avoided costs paid to a QF in the manner proposed by

32   PacifiCorp, except that the risk factor should be set at lower value. We

33   recommend a 15% risk factor as opposed to the 50% proposed by PacifiCorp.

34   The lower risk factor is, as I explained in direct testimony, warranted because of

35   the low risk of non-recovery once a contract has been approved and because of

36   the apparent lack of empirical evidence supporting the debt equivalence

37   hypothesis. Additionally, the Division recommends that the Lawrence Berkley

38   study be updated using recent (i.e., post California energy crises data). In direct

39   testimony I recommended that the Division perform this update with the

40   cooperation of PacifiCorp.

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[1] I cited two reports in direct testimony, this one from Lawrence Berkeley and one from the Energy Information Administration (EIA). However, as pointed out by PacifiCorp witness William E. Avera in rebuttal testimony, the EIA report is based on the analysis performed by the authors of the Lawrence Berkeley report. Therefore, these reports are not independent reports.

41 **Q:** **Do you have other concerns with Dr. Collin's rebuttal testimony?**

42 A: Yes, the Division has several concerns with Dr. Collin's testimony. Some of

43 these concerns are addressed in Ms. Coon's surrebutal testimony. There are,

44 however, several inconsistencies in Dr. Collins testimony I would like to address.

45 For example, on page 3, lines 20-21 of his rebuttal testimony, Dr. Collins

46 misapplies a common rule-of-thumb from statistics.

47 **Q:** **What do you mean by "rule of thumb"?**

48 A: A rule-of-thumb is a rule that is supported by experience. In other words, the rule

49 while not inconsistent with theory, is not specifically derived from theory. In this

50 case, Dr. Collins calls on the rule that 30 (or more) observations are generally

51 sufficient to ensure that the sample mean will follow a normal distribution. The

52 concept comes from a well known theorem in statistics, the Central Limit

53 Theorem (CLT). The CLT says that as the sample size approaches infinity, the

54 familiar z-score transformation of the sample mean, $Z = \dfrac{\bar{X} - \mu}{\sigma/\sqrt{n}}$, will follow a

55 standard normal distribution where μ and σ are respectively the mean and

56 standard deviation of the population from which the sample is drawn, and n is the

57 sample size.

58 Typically, the z-score would be used if a researcher were interested in testing a

59 specific hypothesis about the population mean or trying to estimate a confidence

60 interval for the population mean. The Division's analysis of the GRID model in

61 this docket involved neither of these typical cases. The Division's analysis was

62 an attempt to establish the viability of the GRID model as the basis of an avoided

63 cost methodology. Therefore, Dr. Collins' reference to the 30 observation rule is

64 irrelevant. Ms. Coon talks more about the Division's validation of the GRID

65 model in her surrebuttal testimony.

66 **Q:** **Are there other inconsistencies with Dr. Collins' testimony?**

67 A: Yes, there are several. For example, in his rebuttal testimony on page 6, lines 17-

68 22, Dr. Collins indicates that the IRP identifies 1,400 MW's of wind resources as

69 part of the least cost, least risk optimal portfolio. Dr. Collins states, "The costs of

70 integrating this resource into the system have already been analyzed by the IRP

71 model. Thus no further adjustments need to be made." However, on page 8, lines

72 13-14, Dr. Collins states, "the company's IRP model is technically unable to

73 calculate avoided costs at this time." Dr. Collins can't have his cake and eat it

74 too: either the model is unable to calculate avoided costs and thus further

75 adjustments may be needed; or the model can calculate the avoided costs in which

76 case, the IRP model (or a reasonable substitute such as the GRID model) should

77 be used to set avoided costs.

78 Another example is found on pages 11-12 of Dr. Collins' rebuttal testimony. Dr.

79 Collins refers my direct testimony (DPU Exhibit 1.0, p. 7, lines 119-128) where I

80 identify three conditions under which a proxy plant method could be a reasonable

81 alternative to the DRR method. These conditions are taken from the Tellus report

82   I cite in direct testimony. (See Tellus Report, p. II-3). Dr. Collins claims that a

83   wind resource satisfies these three conditions. The second condition I cite says,

84   "The alternative resource exactly replaces the entire capacity and energy of the

85   proxy plant." (See Tellus report, p. II-7). However, Dr. Collins' own testimony

86   indicates that this condition is not likely to be satisfied. On pages 8-9, lines 17-

87   22, and lines 1-7 respectively, describes an e-mail from Dr. Rich Rosen of the

88   Tellus Institute. The e-mail refers to the appropriate way too price a <u>500</u> MW

89   wind QF. The Wind QF's I am aware of, and in particular the wind QF Dr.

90   Collins represents, are a no where near 500 MW's. IF the QF is not the same size

91   as the DRR resource, then the QF can not replace the capacity and energy and the

92   second condition identified in the Tellus report can not be satisfied. Thus, the

93   proxy method described by Dr. Collins will not provide accurate avoided costs.

94   Dr. Rosen's response cited by Dr. Collins concurs with this interpretation: "you

95   asked how to calculate avoided costs for a certain amount of wind resources, e.g.,

96   500 MW. There is only one correct answer to this problem."   According to Dr.

97   Rosen's explanation the correct way is to use a DRR method. (Dr. Collins'

98   rebuttal testimony, pp. 8-9, lines 21-22, and lines 1-5 respectively). Furthermore,

99   immediately following Dr. Rosen's comments, Dr. Collins concludes, "Thus the

100   proper way to determine the avoided cost of a wind project is to run a production

101   cost model with and with out wind." (Dr. Collins' rebuttal testimony, p. 9, lines

102   6-7).

103   In his direct testimony Dr. Collins states, "simplicity and usefulness are the basis

104   of traditional economic thought …" This is a strange comment for an economist

105   with a doctorate degree to make.   As Ms. Coon pointed out in her rebuttal

106   testimony, the basis for classical economics is not simplicity or usefulness, but is

107   instead rooted in the view that competitive "markets automatically provide

108   harmonious solutions to the conflicts flowing from relative scarcity." [2] Closer to

109   date, modern western economic thought recognizes the inherent complexity such

110   coordination takes. For example, in his text on economics, Paul Heyne states,

111   The successful coordination of activity in such a society where
112   everyone lives by specializing and exchanging, is a task of
113   extraordinary complexity. …

114   Economic theory asserts that the economizing actions people take
115   in the pursuit of their own interests creates the alternatives
116   available to others, and that social coordination is a process of
117   continuing mutual adjustment to the changing net advantages that
118   their interactions generate. That is a very abstract argument.[3]

119   While drawing a demand and supply graph on a chalk board and talking about the

120   affect of price changes and shifts in demand or supply may be a relatively simple

121   exercise, the underlying concepts are extremely complex. Indeed, these concepts

122   are so complex that they prove beyond the comprehension of many, if not most,

123   college freshmen.

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[2] See, Harry Landreth and David C. Colander, *History of Economic Thought*, 3rd Ed., [Houghton Mifflin Company: Boston, 1994], pp. 60-66.

[3] Paul Heyne, *The Economic Way of Thinking*, 9th Ed., [Prentice Hall: Upper Saddle River, New Jersey, 2000], p. 6.

124 **Q:** **What conclusion or recommendation would you draw from these problems**

125 **in Dr. Collins' testimony?**

126 A: Dr. Collins' testimony should be given little, if any, weight in determining an

127 appropriate avoided cost methodology.

128 **Q:** **Does this conclude your surrebuttal testimony?**

129 A: Yes.