BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

IN THE MATTER OF THE APPLICATION OF ROCKY MOUNTAIN POWER FOR AUTHORITY TO INCREASE ITS RETAIL ELECTRIC UTILITY SERVICE RATES IN UTAH AND FOR APPROVAL OF ITS PROPOSED ELECTRIC SERVICE SCHEDULES AND ELECTRIC SERVICE REGULATIONS	))))))))

DPU EXHIBIT NO. 9.0R

DOCKET NO. 08-035-38

PRE-FILED REBUTTAL TESTIMONY OF

DR. WILLIAM A. POWELL

ON BEHALF OF THE

UTAH DIVISION OF PUBLIC UTILITIES

March 9, 2009

1   PRE-FILED REBUTTAL TESTIMONY

2   DR. ARTIE POWELL

3   UTAH DIVISION OF PUBLIC UTILITIES

4   **Q: Would you please state your name, employer, and position?**

5   A: My name is Dr. William, or Artie, Powell. I am the manager of the energy section

6   within the Division of Public Utilities ("Division").

7   **Q: Are you the same Dr. Powell who filed Direct Testimony in this case?**

8   A: Yes, I filed Direct Testimony, DPU Exhibit 9.0, dated February 12, 2009.

9   **Q: What is the purpose of your rebuttal testimony?**

10 A: I am offering rebuttal remarks concerning adjustments proposed by the Committee

11   of Consumer Service's (CCS) witness, Mr. Randall J. Falkenberg. Specifically, I rebut

12   the Sacramento Municipal Utilities District ("SMUD") imputation proposed by Mr.

13   Falkenberg. Mr. Falkenberg adds a levelized value of the up-front payment to the

14   SMUD "current" contract price to arrive at a total price for imputation. As I

15   explained in direct testimony, this approach violates the underlying theoretical

16   principles of levelization and, thus, is not valid. If, for imputation purposes, the up-

17   front payment is to be levelized, then the SMUD contract prices should be levelized

18   in a consistent manner. Additionally, I take exception to the discount rate Mr.

19   Falkenberg apparently uses to levelize the up-front payment.

20   Q: **Will you please briefly explain levelization?**

21   A: Yes. Essentially, levelization is replacing a nominal, or actual, stream of values with a

22   stream of constant values that yield the same present value. There are two steps to

23   levelization. First, we obtain the present value of the stream of original nominal or

24   actual values. Second, the constant levelized value is calculated as the present value

25   of the original stream multiplied by the Capital Recovery Factor ("CRF").[1]

26   For example, suppose we have a stream of values, $\{A_T\}$ = A_1, A_2, . . ., A_T. For

27   the first step, using a discount rate of "i," we can find the present value by the

28   formula,

$$PV_A = \sum_{t=1}^{T} \frac{A_t}{(1+i)^t} \tag{1}$$

29   In the second step, we find the levelized value, A, by multiplying the present value,

30   PV_A, by the CRF:

$$A = PV_A \left[\frac{i(1+i)^T}{(1+i)^T - 1} \right] \tag{2}$$

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[1] The CRF is the ratio of the levelized or annuity value to the present value of receiving that annuity value for a given number of periods using a specified interest rate. See, for example, Eugen L. Grant, W. Grant Ireson, and Richard S. Leavenworth, *Principles of Engineering Economy*, 6th ed., [The Ronald Press Company: New York, New York], 1976.

31   The Division's recommendation, which I presented in Direct Testimony,

32   applies this levelization methodology to both the up-front payment and to the

33   SMUD contract prices.

34   **Q: Did Mr. Falkenberg apply this levelization methodology to both components of the**

35   **SMUD contract?**

36   A: No. Mr. Falkenberg only applies the levelization to the up-front payment. In his

37   Direct Testimony, Mr. Falkenberg states,

38   Based on Exhibit GND-3SS, a constant, per kWh charge,
39   recovery of the up front payment would require an additional
40            $24.9/MWh be added to the contract revenue. Adding this
41   amount to the current contract price ($22.0/MWh) would
42   produce an imputed price of $46.9/MWh.[2]

43   **Q: What are your objections to Mr. Falkenberg's methodology?**

44   A: As I explained in Direct Testimony, adding the levelized value of the up-front

45   payment to the nominal, what Mr. Falkenberg calls the current, contract price is like

46   adding apples and oranges and, thus, is invalid. The concept behind levelization is to

47   place the two components of the SMUD contract on an equal footing in order to add

48   them together. For example, as one leading authority on Engineering Economy

49   states,

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[2] "Direct Testimony of Randall J. Falkenberg: On Behalf of the Committee of Consumer Services," Docket No. 08-035-38, February 12, 2009, p. 25, lines 664-667.

50   Engineering economy studies usually require some
51   conversion [e.g., levelization] as a basis for intelligent decision.
52   A comparison of total payments involved in alternative plans,
53   without the use of interest factors to convert the two series to
54   make them comparable, is nearly always misleading. …

55   Equivalence calculations [e.g., levelization] are
56   necessary for a meaningful comparison of different money
57   time series.[3]

58   Similarly, economists acknowledge that a meaningful comparison of alternative

59   proposals requires a conversion based on the present values of the alternatives. For

60   example, Dr. William F. Shugart (et. al.) states,

61   In order to identify the investment opportunities that
62   comprise the set of acceptable capital projects, the manager
63   must gather and analyze information that is relevant for
64   evaluating various alternative uses of the firm's capital
65   resources. …

66   [M]anagment must evaluate the competing
67   investment proposals in terms of their impacts on the
68   discounted present value of the firm …[4]

69   While the two components of the SMUD contract are, strictly speaking, not

70   alternative investments or projects, the same principles apply: in order to compare

71   or, in this case, add the two components together, requires some conversion based

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[3] Eugen L. Grant, W. Grant Ireson, and Richard S. Leavenworth, *Principles of Engineering Economy*, 6th Ed., [The Ronald Press: New York, New York], 1976, pp. 31-32. (Material in square brackets added).

[4] William F. Shugart II, William F. Chappell, and Rex L. Cottle, *Modern Managerial Economics: Economic Theory for Business Decisions*, [South-Western Publishing Company], 1994, p. 504.

72   on the present value of the components. If applied consistently to both components

73   of the contract, levelization meets this criterion.

74 **Q:** **What discount rate did Mr. Falkenberg use in levelizing the up-front payment?**

75 A: Mr. Falkenberg did not explicitly indentify the discount rate he used, but it can be

76   determined from his testimony. To obtain a levelized value of $24.90 per megawatt

77   hour, as identified in Mr. Falkenberg's testimony,[5] one would need to use a discount

78   of approximately 8.28 percent (0.0828).

79   Note, from Equation 2, there are three inputs into the calculation of the

80   levelized value: the discount rate, the present value, and the number of years.

81   Given the up-front payment of $94 million and the length of the contract, 28 years,

82   the derived discount rate would be 8.28 percent. A presentation of this calculation

83   is in Table 1 below.

84 **Q:** **If you were to apply the 8.28% discount rate to both components of the SMUD**

85   **contract, what per megawatt value would you get for the imputation?**

86 A: Applying the 8.28% discount rate to both the up-front payment and the SMUD

87   contract prices, would yield a levelized per megawatt hour value of $37.88.

88 **Q:** **Do you believe the 8.28% discount rate is reasonable?**

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[5] Falkenberg, p. 25, line 666.

89   A: No. In Direct Testimony, I argued in favor of a discount rate equal to the Company's

90   weighted cost of capital. Since the Company finances generation through a

91   combination of equity and debt, using the weighted cost of capital is reasonable.

92   Also, given the Commission's emphasis in past orders on using information that was

93   contemporaneous to the execution of the SMUD contract, I chose a rate, 10.2%,

94   equal to that ordered by the Commission in the Company's general rate case, Docket

95   No. 89-035-10. This rate case was near in time with the execution of the SMUD

96   contract and just after the merger of PacifiCorp and Utah Power & Light.

97   While Mr. Falkenberg's discount rate of 8.28% is reflective of today's

98   weighted cost of capital, it is substantially below that of the late 1980s. Therefore, I

99   believe a discount rate of 10.2% more reasonably reflects the conditions existing at

100   the time of the SMUD contract execution.

101   **Q:**   **Will you summarize the Division's recommendation?**

102   A: Using a discount rate of 10.2%, and levelizing both the up-front payment and the

103   SMUD contract prices, yields a value of $41.56 per megawatt hour.

104   A summary of the levelizing of the up-front payment is in Table 1, which

105   shows a levelized value of $29.29 per megawatt hour. Levelizing the contract prices

106   from 1987 to 2014 yields a value of $12.27 per megawatt hour.[6] Adding these two

107   values together yields the Division's recommendation of $41.56 for the SMUD

108   imputation adjustment.

109 **Table 1: Levelizing the Up-Front Payment**

Number of Years	28
Up Front Payment	$94,000,000
Annual Megawatt Hours	350,400

Discount Rate	Capital Recovery Factor	Up-Front Levelized Value	Per Megawatt Hour Value
8.28%	9.28%	8,723,678	24.90
10.20%	10.92%	10,264,476	29.29

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111 **Q: Does this conclude your Rebuttal Testimony?**

112 A: Yes, it does.

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[6] Details for these calculations are in Exhibits 9.1 and 9.2 attached to my Direct Testimony in this case, Docket No. 08-035-38.