

BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

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In the matter of the Application of  
PacifiCorp for an Order Approving  
Avoided Costs Rates

Docket 03-035-14  
DPU Exhibit 1.0

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Direct Testimony of Artie Powell

April 12, 2004.

1 DOCKET NUMBER 03-035-14

2 AVOIDED COST METHODOLOGY FOR LARGE QFs

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4 **Q: Please state your name, business address, and employer for the record.**

5 A: My name is Artie Powell; my business address is 160 East 300 South Salt Lake City, Utah  
6 84114; I am employed by the Division of Public Utilities.

7 **Q: On whose behalf are you testifying in these proceedings?**

8 A: I am testifying on behalf of the Division of Public Utilities (“Division”).

9 **Q: Would you please summarize your educational and professional background for the**  
10 **record?**

11 A: I have a PH. D. in economics from Texas A&M University. Since 1995 I have been  
12 employed full time with the Division. While at the Division I have participated in a  
13 number of proceedings including, testifying on ROE in various rate cases; and analyzing  
14 contracts, including several QF contracts, Company self-build options, and avoided costs  
15 for QF less than 1 MW. In addition to my duties at the Division, I currently teach as an  
16 adjunct professor of economics at Weber State University.

17 **Q: What is the purpose of your testimony in these proceedings?**

18 A: I will testify on the avoided cost methodology proposed by PacifiCorp in this docket, as  
19 well as, the avoided methods proposed by US Magnesium and Desert Power in Docket  
20 Nos. 03-035-38 and 04-035-04 respectively.

21 **Q: Will you please summarize your testimony and recommendations?**

22 A: In this docket PacifiCorp proposes a method that is based on the methodology approved by  
23 the Commission for developing Schedule 37, of pricing large QFs. PacifiCorp’s

1 methodology is a combination of market prices and proxy plant comparisons. In Docket  
2 No. 04-035-04, Desert Power proposes a pricing method for large QFs, which is a proxy  
3 plant based methodology. Both methods fall short of the method referred to by Tellus  
4 Institute as the Ideal methodology and are less accurate than the load decrement method  
5 advocated by Tellus.

6 In my testimony I discuss in turn each of the methods proposed by PacifiCorp, Desert  
7 Power, and the a load decrement method discussed by Tellus Institute. I present what I  
8 perceive as the problems associated with PacifiCorp and Desert Power's methods. Finally,  
9 in an attempt to resolve some of the issues surrounding PacifiCorp and Desert Power's  
10 methodologies, I propose an alternative methodology, which is a combination of  
11 PacifiCorp, Desert Power, and Tellus' methods.

12 **Q: Will you summarize the methodologies being presented by PacifiCorp and Desert**  
13 **Power?**

14 A: The pricing methodology proposed by PacifiCorp is based on the same methodology that it  
15 uses to develop or determine the avoided cost rates for QFs with a capacity less than one  
16 megawatt. Indeed, the rates for small QFs, Schedule 37, would form the base for the rates  
17 for large QFs, Schedule 38. Depending on the projected load and resource balance,  
18 PacifiCorp uses either a two or three-step methodology. Essentially, PacifiCorp's avoided  
19 cost methodology is a combination of market pricing and proxy plant methods. In  
20 PacifiCorp's most recent avoided cost filing for Schedule 37, the projected load and  
21 resource balance indicates a summer capacity deficit in 2004 of 305 MW increasing to a  
22 deficit of 2,490 MW in 2008. The winter, however, is capacity sufficient through June

1 2007.<sup>1</sup> Therefore, the most recent avoided cost filing for small QFs is based on the two-  
2 step methodology.

3 To arrive at the rates for a large QF, PacifiCorp's pricing methodology makes adjustments  
4 to Schedule 37 rates. The direction and magnitude of the adjustments are dependent on the  
5 exact operating characteristics of the large QF. Mr. Griswold discusses seven adjustments  
6 in direct testimony<sup>2,3</sup>:

- 7 1. Type of Power: An adjustment would be made to either the capacity or energy  
8 prices depending on the duration and firmness of the capacity and energy being  
9 provided by the QF. If the QF agrees to provide energy and capacity on a firm  
10 basis, then the QF should receive both a capacity and energy payment. If the QF  
11 agrees to provide power only on a non-firm basis, then the QF would receive no  
12 capacity payment and the energy payment would be reduced by 7%, to reflect the  
13 cost of operating reserves that PacifiCorp would be required to carry on its system.<sup>4</sup>
- 14 2. Peak Availability: The rates for Schedule 37 assume that both energy and capacity  
15 will be available during the Company's daily and seasonal peaks. If the QF does  
16 not commit to delivering power during these periods, then under PacifiCorp's

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<sup>1</sup> "Schedule 37: Avoided Cost Purchases from Qualifying Facilities," PacifiCorp filing, Docket 03-035-T10, January 30, 2004, p. 1 and Table 1.

<sup>2</sup> "Direct Testimony of Bruce W. Griswold," Docket No. 03-035-14, February 2004, pp. 2-8.

<sup>3</sup> I have combined the adjustments for dispatch and reliability for convenience.

<sup>4</sup> The 7% figure is based on the Minimum Operating Criteria of WECC. See Griswold, pp. 2-3.

1           proposal the QF would not receive a capacity payment for those peak periods when  
2           it is does not provide capacity and energy.

3           3. Dispatch and Reliability: The capacity payment would be adjusted based on the  
4           difference between the expected monthly capacity factor of the QF and the proxy  
5           unit used in developing Schedule 37. According to Mr. Griswold, the adjustment  
6           would be a straight-line adjustment calculated from the ratio of the QF and proxy's  
7           monthly capacity factors plus the actual (or estimated) operating reliability  
8           compared to the proxy resource.

9           4. Debt Related Costs: As witnesses Mendez and Williams explain,<sup>5</sup> a QF contract,  
10          depending on the actual terms and conditions of the contract, may require  
11          PacifiCorp to record the contract as debt on its balance sheet. Carrying the QF  
12          contract as debt could impose additional financing costs on PacifiCorp. Any  
13          adjustments would, according to Mr. Griswold, be addressed as an item in each  
14          contract and, if appropriate, would be designated as a line-item adjustment on the  
15          QF's bill.

16          5. Integration Costs: An adjustment to Schedule 37 would be made to reflect the  
17          integration costs of each large QF.

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<sup>5</sup> "Direct Testimony of David J. Mendez" and "Direct Testimony of Bruce N. Williams," Docket No. 03-035-14, February 2004.

1           6. Green Tags: A positive adjustment would be made to the avoided cost payments  
2           made to those QFs qualifying for renewable energy credits (“green tags”) where the  
3           Commission finds that the green tags will accrue to the benefit of the ratepayers.

4           7. Contract Costs: Additional adjustments could be made to Schedule 37 rates  
5           depending on such factors as non-compliance, credit requirements, and  
6           performance variance.

7           Desert Power’s methodology (Docket No. 04-035-04), which is the same methodology  
8           proposed by US Magnesium (Docket No. 03-035-38), is a proxy plant methodology. In its  
9           application, Desert Power proposes using West Valley as the proxy plant or what it refers  
10          to as the “next deferrable plant” (“NDP”). The NDP would potentially change for each  
11          QF as the process moves forward in time and new information becomes available or  
12          conditions change.

13          Desert Power’s approach would pay the QF the lower of market or costs of the NDP.  
14          Therefore, there are really two parts to Desert Power’s proposal.<sup>6</sup> In the first part, when it  
15          is economical for PacifiCorp to dispatch the NDP – when the variable operating cost of the  
16          NDP are less than the market price – QF prices would be based on the estimated costs of  
17          the NDP.

18          1. The capacity payment would be derived from the NDP. Desert Power proposes  
19          deriving the capacity payment from West Valley’s lease payments.

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<sup>6</sup> “Prefiled Direct Testimony of Roger J. Swenson,” Docket No. 04-035-04, January 23, 2004, pp. 7-14

1           2. The energy payment for the first year of the QF contract would be based on the  
2           actual fixed and variable O&M costs of the NDP plus the estimated fuel costs of  
3           the NDP. The fuel cost would be derived using the estimated heat rates from the  
4           NDP and a publicly available gas index. After the first year of the QF contract, the  
5           fixed and variable components would be escalated based on inflation.

6           In the second part of Desert Power’s pricing proposal, when it is uneconomical to dispatch  
7           the NDP, the avoided cost rates for the QF would be based the net resource position of  
8           PacifiCorp: in those hours where PacifiCorp is a net seller, the QF would be paid a non-  
9           firm market price; in those hours where PacifiCorp is a net buyer, the QF would be paid a  
10          firm market price.

11   **Q: What do you see as the advantages and disadvantages of these two methods?**

12   A: PacifiCorp’s method would provide consistency between setting rates for small and large  
13   QFs in Utah. Since the methodology for setting Schedule 37 rates is familiar to Utah  
14   regulators, it would reduce the administrative and evaluation costs associated with each  
15   new large QF proposal for regulators. Likewise, since the proposed methodology is  
16   similar to that used in several other jurisdictions where PacifiCorp operates, it would  
17   reduce PacifiCorp’s administrative burden as well. The proposed methodology would also  
18   help “streamline the QF process and give prospective QFs a consistent starting point from  
19   which new projects can be evaluated.”<sup>7</sup> Additionally, PacifiCorp’s method has the

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<sup>7</sup> PacifiCorp Data Response Supplemental, DPU Data Request 3.1, Docket No. 03-035-14, April 8, 2004.

1 advantage that the proxy plant is that type of resource identified as the NDP by the  
2 Company's IRP and, therefore, would be scrutinized in public forums.

3 PacifiCorp's method, however, does require the use of the GRID model. This has been an  
4 area of concern for some participants in other QF proceedings, and will probably continue  
5 to be such in the future. For example, some parties have complained of the inability to  
6 really get behind or verify numbers or rates offered to large QF projects by PacifiCorp. In  
7 addition, PacifiCorp's method requires forecasting several key variables including natural  
8 gas prices. While I don't believe these are insurmountable problems, they are legitimate  
9 problems that would need to be addressed if PacifiCorp's method were adopted or  
10 approved by the Commission.

11 Desert Power's methodology, like that of PacifiCorp, is very simple. It employs the costs  
12 of a known resource as the basis of the QF rates, which could be calculated in an  
13 elementary spreadsheet model. However, I believe there are several disadvantages with  
14 Desert Power's methodology. First, although the method differentiates between hours  
15 where PacifiCorp is a net buyer and net seller of power in the market, it does not take into  
16 account PacifiCorp's load and resource balance over extended periods. For example,  
17 PacifiCorp projects that it will need capacity only in the summer months between 2004  
18 June 2007. Desert Power's proposal, however, would require PacifiCorp to purchase both  
19 capacity and energy in every month, which could force PacifiCorp to back down what are



1 potentially cheaper resources, thus costing ratepayers more than PacifiCorp’s “true”  
2 avoided costs.<sup>8</sup>

3 Second, Desert Power identifies West Valley as its NDP. As explained in Mr. Swenson’s  
4 testimony, “the purchase price paid by PacifiCorp during the first year will be based upon  
5 the fixed and variable costs actually incurred by PacifiCorp in connection with the West  
6 Valley units ... After the first year, the fixed and variable components will be adjusted  
7 based upon inflation.”<sup>9</sup> However, in response to a data request PacifiCorp explained that  
8 the lease payments for West Valley are fixed over the lease period.<sup>10</sup> If the lease payments  
9 are fixed, then the payments would include the affects of inflation and it would be  
10 inappropriate to escalate the rates further.

11 Third, it does not seem reasonable to me to assume, as Desert Power’s pricing proposal  
12 does, that Desert Power’s QF proposal will displace West Valley. It is more likely, given  
13 PacifiCorp’s projected load and resource balance, that West Valley as well as considerable  
14 additional resources will be required to meet PacifiCorp’s resource needs over the next  
15 several years.

16 Finally – and this is an inherent disadvantage in both PacifiCorp and Desert Power’s  
17 methodologies – neither of the proxy plants proposed by PacifiCorp or Desert Power are

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<sup>8</sup> Even though Desert Power’s method has PacifiCorp paying non-firm market prices to the QF in those hours were PacifiCorp is a net seller, this still could potentially require PacifiCorp to back down less expensive resources. Unless PacifiCorp can resell this power in the market at the non-firm price, Desert Power’s pricing proposal could result in uneconomic payments to the QF.

<sup>9</sup> Prefiled Direct Testimony of Roger J. Swenson, Docket No. 04-035-04, January 23, 2004, p. 9.

<sup>10</sup> PacifiCorp Data Response, DPU Data Request 3.1, Docket No. 03-035-14.

1 similar to Desert Power’s QF proposal. According to the Tellus Institute, “When the  
2 operating characteristics of the proxy plant do not closely match those of the alternative  
3 resource under consideration, the estimated components of the total avoided cost may be  
4 far from the alternative resource’s true avoided cost components.”<sup>11,12</sup>

5 **Q: Does Tellus have more to say about avoided cost methodologies?**

6 A: Yes, as a matter of fact it does. According to Tellus, there are three basic methods for  
7 calculating avoided costs: the *ideal* method, the *proxy* plant method, and the *differential*  
8 *revenue requirements* method. Each of these methods essentially “uses the difference in  
9 the revenue requirements that would result from including the alternative resource in a  
10 utility’s resource mix.” This difference, and thus the true avoided cost of the alternative  
11 resource, can, according to Tellus, “be calculated with complete accuracy using the *ideal*  
12 *avoided cost methodology*.”<sup>13</sup>

13 Under the Ideal method, the avoided cost for each alternative is found by:

- 14 1. Creating an optimal plan to meet expected load in each year of the planning period and  
15 computing the annual revenue requirement for this plan;

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<sup>11</sup> “Costing Energy Resource Options: An Avoided Cost handbook for Electric Utilities,” Tellus Institute [Boston, Massachusetts], September 1995, p. II-9.

<sup>12</sup> According to Tellus’ web site, “Tellus was established in 1976 as a not-for-profit research and policy organization. The aim was to bring an integrated and multi-disciplinary approach to critical environmental and resource issues.” The Avoided Cost Handbook was funded by the U.S. Environmental Protection Agency and the U.S. Department of Energy. In the preface to the report, Tellus states that the purpose of the report is to “promote the widespread use of standardized avoided cost methodologies ... [and] development of accurate avoided costs estimates for electric utilities.” (See p. Forward – 1).

<sup>13</sup> *Op. Cit.*, p. II-1.

- 1           2. Creating a new optimal plan to meet loads that reflect the impact of the alternative  
2           resource being considered and computing the annual revenue requirement for this new  
3           plan;
- 4           3. The difference in the revenue requirements is the true avoided cost.<sup>14</sup>

5           This Ideal approach is similar to the IRP based approach that PacifiCorp originally  
6           proposed in its May 30, 2003 filing. An obvious disadvantage to the Ideal approach is that  
7           it may be cumbersome and time consuming, especially if there are numerous alternative  
8           resources that must be considered.<sup>15,16</sup>

9           **Q: If PacifiCorp's IRP method is similar to the Ideal method, why do you think**  
10           **PacifiCorp is now proposing a different methodology?**

11          A: I believe there are two related reasons. First, after the original filing wherein the IRP  
12          method was proposed, the Commission, based on filings by other parties, ordered that  
13          PacifiCorp and other interested parties work out how capacity payments were to be  
14          calculated and paid. However, the group could not reach a consensus. Second, the failure  
15          to reach a consensus was partially due to some inconsistent results from several IRP runs.  
16          At one point in addressing the capacity payment issue, PacifiCorp restricted sales in the  
17          IRP model. The results from these runs indicated that a small QF provided more value to  
18          the system that did a large QF.

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<sup>14</sup> *Ibid.*, p. II-2.

<sup>15</sup> *Ibid.*

<sup>16</sup> If more than one alternative is under consideration, the Ideal approach would proceed by first prioritizing the alternatives, in some manner, from the least cost to the highest cost resource. This sorting could require multiple model runs before actually calculating the true avoided costs.

1 **Q: Do these results you refer to imply that the IRP method is unworkable or invalid?**

2 A: In my opinion they do not. The trouble or inconsistency was not in the IRP model or  
3 methodology but was in the assumed restriction on sales. If the group had had more time –  
4 if PacifiCorp had not had to file a new proposal and if Desert Power and others were not  
5 waiting for the results coming out of this docket – I believe that a solution to the capacity  
6 payment problem could have been found.

7 **Q: You indicated that Tellus discusses two other methods the Proxy Plant method and**  
8 **the Differential Revenue Requirements methods. Obviously, both PacifiCorp’s newly**  
9 **proposed method and Desert Power’s method are similar to the Proxy Plant method.**  
10 **What does Tellus have to say about this method?**

11 A: Tellus warns that, “In most instances, the proxy plant methodology is only a crude  
12 approximation for calculating avoided costs.”<sup>17</sup> This is because the avoided costs derived  
13 from the proxy plant method depend directly on several key assumptions concerning the  
14 plant’s operating characteristics. For example, if the alternative resource under  
15 consideration has a high capacity factor, the researcher may be inclined to choose a base-  
16 load plant as the proxy. However, as Tellus warns, while the proxy plant method has the  
17 advantage of being relatively straightforward, the proxy plant method will yield accurate  
18 results only if two conditions are met:

19 1. “The operating characteristics (including the fuel type, the online date, the capacity  
20 factor, and the lifetime) of the proxy plant closely match those of the alternative  
21 resource”; and

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<sup>17</sup> Op. Cit., Tellus Report, p. II-3.

1        2. ‘The alternative resource exactly replaces the entire capacity and energy provided by the  
2            proxy plant in a resource plan and does not significantly affect any other plant additions  
3            or operations.’<sup>18</sup>

4        If these two conditions are not met, it is highly unlikely, as I previously indicated, that the  
5            proxy plant method will yield that are crude approximations to the true underlying avoided  
6            costs. However, even if the proxy plant approach could yield accurate avoided capacity costs  
7            (i.e., if the first condition were met), the total avoided costs are still likely to be inaccurate.  
8            This is because “[t]he operating costs and characteristics associated with a *single* type of  
9            [proxy plant] cannot typically represent those associated with the complex set of avoided  
10           power plants (and plant operations) that actually result when an alternative resource is added  
11           to a utility system.”<sup>19</sup>

12    **Q: You indicated that there was a third method discussed by Tellus. Can you explain a**  
13    **little about this method?**

14    A: The third method discussed in Tellus’ report is the differential revenue requirements  
15            method using a load decrement. According to Tellus, “Under this approach, the difference  
16            in revenue requirements can be approximated extremely accurately.”<sup>20</sup> The procedure for  
17            using the decrement approach requires:

18            1. Design the load decrement to closely match the characteristics of the alternative resource;

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<sup>18</sup> *Ibid.*, p. II-7.

<sup>19</sup> *Ibid.*, p. II-9.

<sup>20</sup> *Ibid.*, p. II-1.

- 1           2. Prepare two least costs plans: one prior to subtracting the load decrement and one after  
2           subtracting the load decrement which represents the impact of the alternative resource in  
3           question; and
- 4           3. The difference in the revenue requirements between the two plans represents the avoided  
5           costs of the alternative resource.

6           Tellus identifies four key characteristics that need to be carefully considered in designing the  
7           decrements: (i) size (MWs) adjusted for losses, (ii) start date, (iii) years of duration, and (iv)  
8           energy/peak contribution (load/capacity factors).

9           **Q: PacifiCorp argues that several adjustments must be considered when determining the**  
10           **rates for a large QF. Do these adjustments mitigate the issues or problems you**  
11           **discuss with respect to the proxy plant method?**

12          A: Yes, if the Commission were to adopt either PacifiCorp or desert Power's methodologies,  
13          the adjustments discussed in Mr. Griswold's testimony would I believe mitigate to some  
14          extent the problems with the proxy plant method. However, in light of the issues I  
15          discussed previously, a method that combines features from both approaches and Tellus'  
16          load decrement approach is more likely to yield reasonable avoided costs for large QFs.

17          **Q: Do you have a methodology in mind?**

18          A: If the Commission decides that the load decrement approach discussed by Tellus is not  
19          appropriate, then a hybrid approach may be workable. The approach I have in mind would  
20          combine features from PacifiCorp, Desert Power, and Tellus' load decrement approach.  
21          Briefly, the hybrid method would require:

- 1       1. A development of a load decrement that closely follows or mirrors the operating  
2           characteristics of the proposed QF. This decrement would be developed with particular  
3           regard to the key operating assumptions identified by Tellus and discussed previously  
4           herein.
  
- 5       2. The decrement would be used in a manner similar to PacifiCorp's proposal (i.e., a  
6           Schedule 37 rate would be developed). This rate would serve as the starting point of the  
7           large QF rate. The starting rates would take into account, as does PacifiCorp's method,  
8           PacifiCorp's projected load and resource balance and would give credit to the QF for  
9           energy and capacity only as needed. As is the case with Schedule 37, there may be  
10          several years up front where the QF pricing is based on market prices, before the proxy  
11          plant costs are relevant to establishing the QF rates.<sup>21</sup>
  
- 12      3. The fixed and variable O&M and capacity components would be escalated based on  
13          inflation after the first year. However, the fuel costs would be based on known elements.  
14          For example, the fuel expense could be similar to that proposed by Desert Power,  
15          namely, a heat rate times a known or verifiable fuel price index.

16      This approach has several advantages over either PacifiCorp or Desert Power's proposals.  
17      First, since the hybrid approach uses the load decrement approach the proxy is more likely to  
18      be representative of the QF proposal and, thus, is more likely to yield accurate results.

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<sup>21</sup> In the most recent filing of Schedule 37 rates, the QF rates during the years 2004 through June 2007 are essentially based on results from the GRID model. From July 2007 to the end of the analysis the QF rates are based on the costs of the proxy CCCT plant.

1 Second, although some modeling would be required to develop a starting point, the modeling  
2 requirements and forecasting assumptions are much less than is the case in an IRP or full  
3 load decrement approach. This should mitigate to some extent third party concerns about the  
4 black-box effect of PacifiCorp's past pricing proposals. Third, the hybrid method is  
5 relatively transparent and incorporates the transparent escalation features of both  
6 PacifiCorp's and Desert Power's methods, as well as the open ("actual") fuel expense  
7 determination of Desert Power's method.

8 **Q: Do you have a recommendation?**

9 A: Yes. The Commission established the QF task force in an effort to address some of the  
10 issues presented by various parties with respect to QF pricing. The group met and  
11 discussed a possible methodology based on the IRP model. To date, unfortunately, that  
12 group has been unable to reach a consensus. However, a method based on the IRP is  
13 exactly the type of decremental method advocated by the Tellus Institute, and is the  
14 preferred methodology of the DPU. The DPU, however, recognizes the practical problems  
15 that arose in the discussions among the various parties leading up to the present filing of  
16 PacifiCorp in this docket. The DPU does not believe that these problems are  
17 insurmountable and recommends that the QF group continue working toward a viable load  
18 decrement method based on the IRP. In the interim, between now and the establishment of  
19 a load decrement approach, the DPU recommends the adoption of the hybrid method  
20 discussed above. This method could be used to set rates for Desert Power (and possibly  
21 U.S. Magnesium).

22 **Q: Does this conclude your testimony?**



1 A: Yes.