Q. Are you the same Gregory N. Duvall who submitted direct and rebuttal testimony on behalf of the Company in this phase of the proceeding?

A. Yes.

Q. What is the purpose of your surrebuttal testimony?

A. My surrebuttal testimony responds to the rebuttal testimony submitted by other parties in this phase of the proceeding, including rebuttal testimony submitted by Dr. Abdinasir M. Abdulle, Ph.D. on behalf of the Division of Public Utilities ("Division" or "DPU"); Mr. Randall J. Falkenberg on behalf of the Office of Consumer Services ("OCS"); and Ms. Sarah Wright on behalf of Utah Clean Energy ("UCE"). In addition, my surrebuttal testimony responds to the comments submitted on May 14, 2013, by Ms. Maura Yates on behalf of Sun Edison, LLC ("Sun Edison"). Specifically, I respond to issues surrounding the methodology for calculating avoided cost pricing for renewable qualifying facilities ("QFs") larger than three megawatts primarily focused on the issue of capacity contribution for wind and solar resources.

Q. How is your surrebuttal testimony organized?

A. The first section of my surrebuttal testimony addresses the issue of capacity contribution for wind and solar resources. The remainder of my testimony addresses other issues raised by UCE and Sun Edison.

Q. Please summarize your surrebuttal testimony.

A. The focus of my surrebuttal testimony is to respond to proposals that would artificially increase the capacity contribution for renewable resources, resulting in a departure from the fundamental premise of customer indifference established by

the Public Utilities Regulatory Policies Act ("PURPA"). For avoided cost purposes, the capacity contribution is used to set the capacity payment to renewable QF resources based on their ability to defer the next deferrable resource in the IRP – namely Front Office Transactions ("FOTs") in the sufficiency period and a Combined Cycle Combustion Turbine ("CCCT") in the deficiency period. There are two general approaches to measuring capacity contribution before the Commission. Both approaches are reliability-based, but one focuses on average energy reliability while the other focuses on reliability at the time of system peak loads. The average energy approach supported by DPU, OCS, UCE, and Sun Edison is referred to as the Effective Load Carrying Capability ("ELCC") method, the Capacity Factor ("CF") method and the Capacity Factor Assumption Model ("CFAM") method. The capacity approach presented by the Company is referred to as the exceedance method.

In my surrebuttal testimony, I show that the average energy approach degrades the Company's ability to meet its system coincident peak load, which is the measure of capacity used by the Integrated Resource Plan ("IRP"). The consequence of using the energy-based calculation endorsed by other parties to determine capacity contribution is to either degrade reliability during peak load hours or require customers to pay twice to maintain the same level of reliability. In contrast, I show that the Company's capacity approach is the most reasonable means of determining a fair and accurate capacity payment to renewable QF resources and does not degrade system reliability at the time of system peak load.

The determination of avoided cost prices paid to a QF is governed by PURPA and is limited to the cost of energy and capacity that the utility would have generated on its own or purchased but for the addition of the QF. When avoided costs are properly set, the utility's customers are indifferent to whether the energy and capacity is provided by the QF or other means. Avoided cost prices should not include calculations or adders designed to provide incentives for specific types of QFs, such as renewable resources. Such policy directives, if desired by a state, should be implemented outside of the realm of PURPA. Ultimately, it is the Company's role to comply with PURPA but it is our customers who are impacted by bearing the cost of QF purchases as approved by the Commission.

Capacity Contribution

Q. Which parties address capacity contribution in rebuttal testimony?

A. DPU, OCS, and UCE each address capacity contribution in their rebuttal testimony. Most strikingly, DPU, OCS, and UCE have all changed their position on capacity contribution between their direct and rebuttal testimony. Sun Edison provided comments on capacity contribution at the time rebuttal testimony was filed, but failed to present a direct case on the issue at the time direct testimony was filed.

Q. Please summarize DPU's rebuttal testimony on capacity contribution.

A. DPU initially shows that the Days of Dependence on Supplemental Capacity Resources ("DSCR") reliability metric proposed by Mr. Falkenberg in his direct testimony yields varied results that cannot be relied upon. DPU identifies

matching problems with Mr. Falkenberg's application of the DSCR method and concludes that even if the matching problems were corrected, the DSCR method would yield varied results that cannot be relied upon. DPU further expresses their belief that the DSCR method does not calculate the capacity contribution or value of wind.

The remainder of DPU's testimony on capacity contribution focuses on supporting their new proposal which is to use the ELCC method when adequate data is available to make the intense computations required by the ELCC method, or to use the CF method when data may not be available. The CF method is a method that approximates the ELCC method, but does so by using simplifying assumptions to reduce the processing time.

Q. Does DPU make any further recommendations?

A. Yes. DPU recommends that the capacity contribution for wind be set in the range of 8.72 percent and 12.03 percent based on various approaches to averaging and weighting the 500 hours of data included in the Company's capacity contribution study. For solar, the DPU indicates they have no recommendation, but then point to the numbers from the National Renewable Energy Laboratory ("NREL") report provided in UCE's direct testimony as values that could be used for purposes of solar capacity contribution. DPU recommends that the values for wind and solar be set on an interim basis and that a process be conducted to develop more information that would allow the Commission to make a final decision.

Q. Did the DPU take a position in its direct testimony on capacity contribution?

A. Yes. Dr. Abdulle states the DPU's position on page 12 of his direct testimony where he says:

> **Q. What is the position of the Division regarding the Company's proposed update of the capacity contribution?**
>
> A. *The Division does not oppose the Company's proposed update to the capacity contribution.* However, because the circumstances under which the Company is operating are not always the same from one time period to the next, the Division recommends that the capacity contribution needs to be updated periodically, probably at least annually. (*Emphasis added*)

DPU's position put forth in rebuttal testimony directly contradicts their position they took in direct testimony. This was done without presenting any rationale for abandoning their support for the Company's method. The only reference to the Company's method is an assertion by Dr. Abdulle that the DPU believes that the method presented by UCE witness Ms. Wright is a superior method to that of either the Company or Mr. Falkenberg apparently based on a belief that Ms. Wright's methodology appears to be an industry standard for calculating the capacity value for renewable resources.

Q. How can the DPU take the same 500 hours of data used by the Company and get different capacity contribution values than the Company?

A. The DPU did not consider the contribution of wind or solar at the time of system coincident peak as was done by the Company. In order to displace a CCCT from the load and resource balance at the time of system coincident peak load as identified in the IRP, the timing of the peak contribution has to match up with the coincident peak load. The DPU calculations did not take this into account. I will show throughout this testimony that the Company is the only party that took this

into account and therefore the Company's method of determining capacity contribution is the most accurate and only reasonable approach for determining the cost of capacity that a renewable QF resource can actually avoid.

Q. Do you have any other comments on the DPU's capacity contribution proposal?

A. Yes. Contrary to Dr. Abdulle's testimony, the Commission should not use the capacity contribution numbers for solar that were included in Ms. Wright's direct testimony. These values come directly from the NREL study, and NREL warned not to use the values in their study at an individual utility level since they were based on Western Energy Coordinating Council ("WECC") wide load data rather than individual utility load data. Mr. Falkenberg and I both warned against using numbers directly from the NREL study for determining the capacity contribution of solar resources for PacifiCorp for the same reason stated by NREL.

Q. Does the Company support DPU's proposal for an additional process to further explore the issue of capacity contribution?

A. Yes. If the Commission determines that an additional process is necessary to fully vet the issue of capacity contribution, the Company would participate in such a process.

Q. Please summarize the OCS's rebuttal testimony on capacity contribution.

A. Mr. Falkenberg announces his endorsement of the ELCC method in his rebuttal testimony claiming that the DSCR method he supported in his direct testimony is "conceptually similar" to the ELCC method even though that was not stated in his direct testimony. He points out that the data from the NREL study contained in

Ms. Wright's Table 1 cannot be directly applied to the PacifiCorp system, and computes numbers using the CF method that he indicates is an approximation of the ELCC method. Mr. Falkenberg recommends solar capacity contribution values of 49.6 percent (energy oriented) and 59.1 percent (peak oriented) based on the numbers he computed using the CF method and recommends wind capacity contribution values of 13.8 percent based on the DSCR method or 20.5 percent based on the CF method.

Q. Did OCS take a position on capacity contribution in its direct testimony?

A. Yes. For wind, OCS supported the DSCR method which was shown to be faulty by both DPU and the Company in rebuttal testimony. No further rebuttal to the DSCR method is necessary at this time. For solar, OCS makes the following recommendation on page 2 of Mr. Falkenberg's direct testimony:

> 1. For solar QF capacity, there is no Company specific actual data. For this reason, *I don't oppose the Company's method for assessing a capacity payment for solar QFs*, but recommend the entire analysis should be revisited when actual data becomes available. (*Emphasis added*)

OCS's position put forth in rebuttal testimony for solar capacity contribution directly contradicts their position they took in direct testimony. This was done without presenting any rationale for abandoning their support for the Company's method.

Q. How can OCS take the same 500 hours of data used by the Company and get different capacity contribution values than both the Company and DPU?

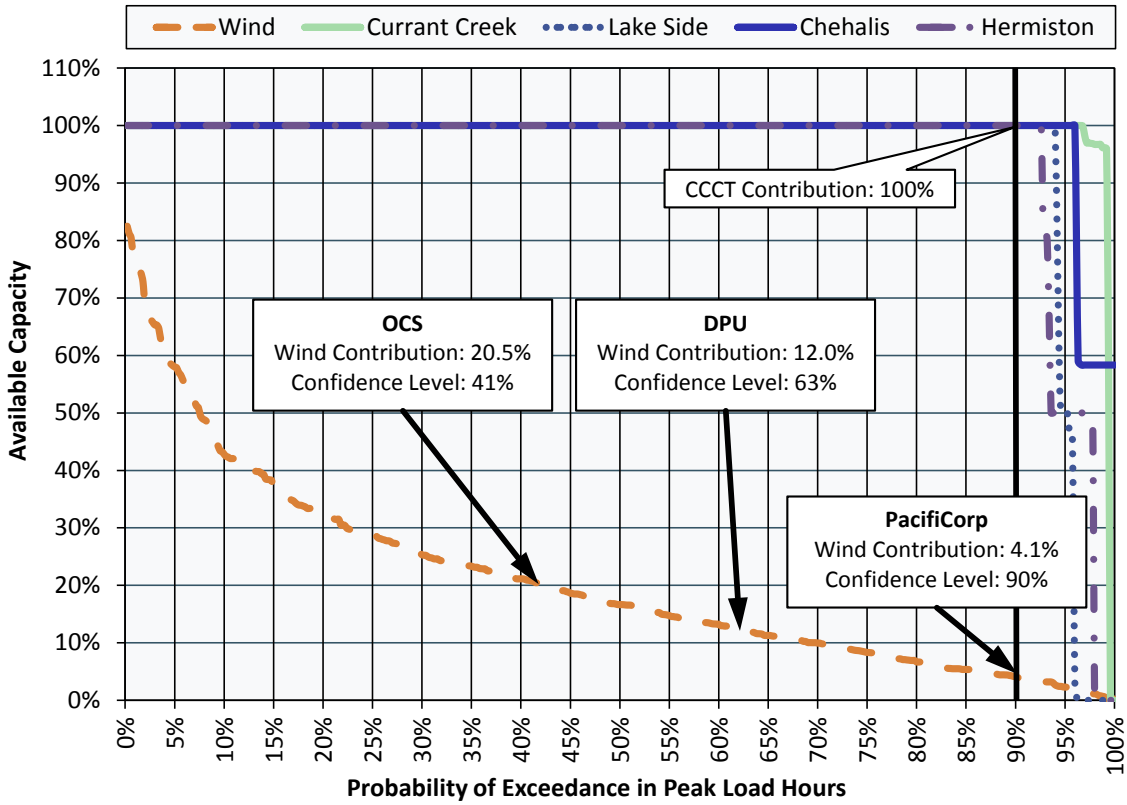
A. Mr. Falkenberg took the simple average of 500 hours. He did not apply any weightings to the hours like the DPU nor did he make any consideration for the

expected contribution of wind or solar at the time of system coincident peak as done by the Company.

Q. Can the DPU, OCS, and the Company's methods be compared on an equivalent basis?

A. Yes. It is critical to analyze the impact of each method on the Company's ability meet peak demand with the same reliability provided by a CCCT (the next deferrable resource identified in the Company's IRP). The degree of confidence that a resource will be available to meet the Company's peak load obligation can be expressed as a probability of exceedance. For example, in the capacity contribution study provided with my direct testimony the Company demonstrated that, based on actual generation from 2007 through 2011, it can be 90 percent confident that wind resources will provide approximately 4.1 percent of their nameplate capacity during peak load hours. Figure 1 below compares the Company's calculation to the other percentages endorsed by the DPU and OCS in their rebuttal testimony on a similar basis.

Figure 1
Wind and Thermal CCCT
Probability of Exceedance in Peak Load Hours 2007-2011
Comparison of DPU, OCS and Company Exceedance Levels



Q. What does Figure 1 show?

A. Figure 1 shows that the proposals from OCS and DPU provide a 41 percent and 63 percent confidence level, respectively, that capacity from wind QF resources will be available at the time of system coincident peak. Stated differently, under the OCS CF method proposal, a QF wind resource would be unavailable to meet the system coincident peak load 59 percent of the time. If the OCS or DPU methods were adopted, the reliability of the system to meet system coincident peak load would degrade. The Company's proposal is the only proposal that reasonably maintains the reliability of the system to meet coincident peak load.

Q. The NREL report characterizes the ELCC and CF methods as reliability-based methods. Do you agree?

A. Yes. The reliability measured by the ELCC and CF methods is average energy reliability, not reliability at the time of system coincident peak. This is clearly illustrated in Figure 1.

Q. Is it appropriate to use an average energy method to determine the avoided cost of capacity paid to a QF?

A. No. The appropriate reliability standard that should be applied to the Proxy/PDDRR method is reliability at the time of system peak. Consider the dramatic example if all of the Company's thermal resources performed at the level of reliability during peak load hours as proposed by the intervenors for renewable resources. If the Company's thermal resources were available only 41 percent of the time during peak load, the Company would not be able to provide service to customers 59 percent of the time. Alternatively, additional capacity would need to be acquired to ensure customers were served. For example, at a 20.5 percent capacity contribution 100 MW of wind would be deemed to offset 20.5 MW of a CCCT. However, in practice Company could only count on 4.1 MW of the wind being available to meet peak load at the same level of reliability as the CCCT. To maintain reliability the Company would have to procure the 16.4 MW difference in addition to purchasing from the QF. Paying twice for the capacity is contrary to PURPA.

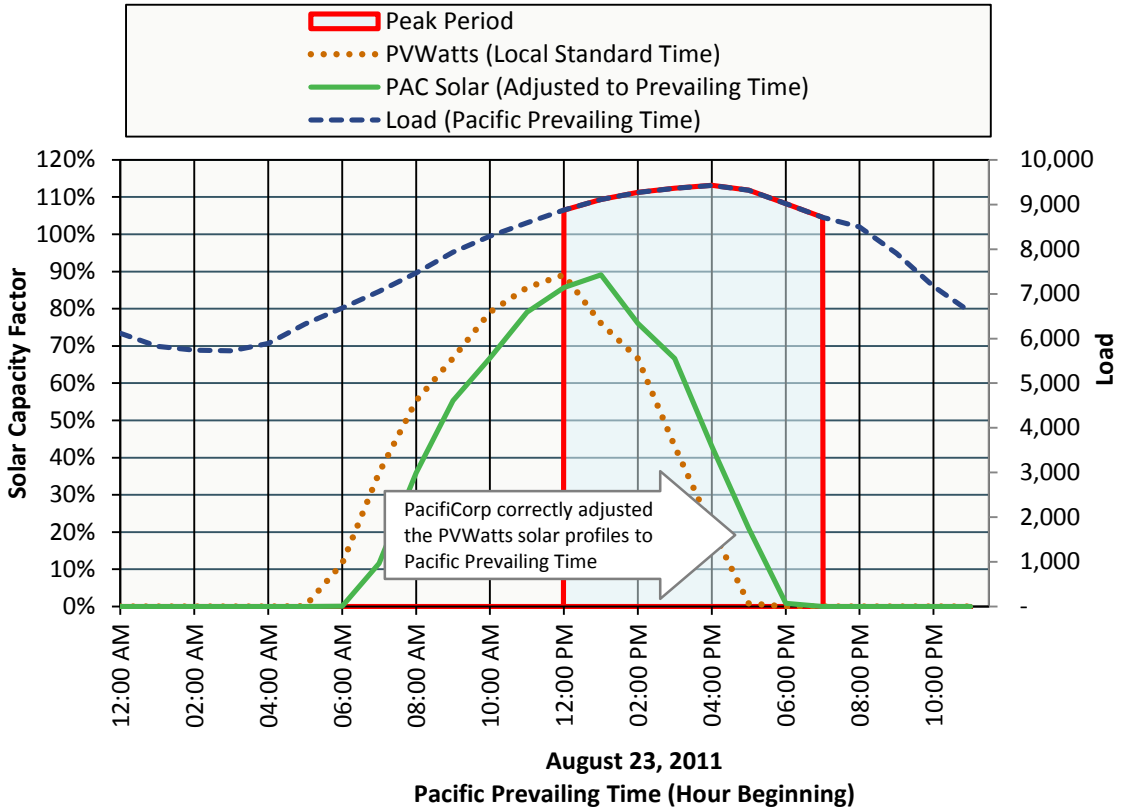
Consistent with the customer indifference standard established in PURPA, prices paid to a QF should reflect the cost of energy and capacity that the

Company would procure in the absence of the QF. Ultimately the question is whether the Company can avoid building a reliable resource to meet peak load due to the addition of a QF resource. In order for a QF to displace the capacity provided by a CCCT identified in the Company's IRP as required to meet system peak load, the QF must provide capacity to meet the system peak with an equal degree of confidence afforded by the CCCT. To the extent a QF provides valuable energy to the Company in other hours throughout a year, the Proxy/PDDRR method captures that value through differential GRID runs and prices are set accordingly. If a state determines it would like to provide incentives to foster development of renewable resources, policy actions in support of such incentives should be taken in other venues and not in the context of avoided costs.

Q. How does the output of solar resources align with the Company's system coincident peak?

A. Figure 2 illustrates how the timing of solar output compares to the timing of the Company's peak load.

Figure 2
Comparison of Solar Output with PacifiCorp Load



Q. What does Figure 2 show?

A. Figure 2 shows that the timing of the peak output of solar resources on PacifiCorp's system do not occur at the same time as PacifiCorp's peak load. Over the past five years, PacifiCorp's system coincident peak load occurred at hour beginning 2PM Prevailing Pacific Time ("PPT") on one occasion, 3PM PPT on one occasion, and 4PM PPT on three occasions. Figure 2 clearly shows that solar resources on PacifiCorp's system are not at their peak output at the time of system coincident peak, and therefore are not able to displace a CCCT based on the non-coincident peak output of the solar resources. PacifiCorp's method for calculating capacity contribution takes these timing differences into account. The ELCC and CF methods do not.

Q. Please summarize UCE's rebuttal testimony on capacity contribution.

A. UCE proposes use of the CFAM in rebuttal testimony. This appears to be the same as the CF method proposed by DPU and OCS. UCE indicates that their rebuttal recommendation to use the CFAM method is a simple alternative to the ELCC in the event the ELCC is deemed too onerous. UCE's proposal suffers from the same deficiencies as the proposals from DPU and OCS which have been previously described and require no further rebuttal.

Other Issues

Q. Are there other issues presented by UCE that need to be addressed?

A. Yes. There are two other issues raised by UCE that I will address.

Q. What is the first issue?

A. UCE recommends that renewable QFs receive and "un-capped" energy payment stream in addition to capacity payments beginning in the first year. Ms. Wright mistakenly states that the Company "adjusts the energy payment, outside of the GRID model, by capping the entire energy payment by the dispatch cost of the next deferrable resource at PacifiCorp's assumed fuel price."

Q. Has the Company capped the energy payment stream?

A. No. The avoided energy costs are calculated using the GRID model for the entire length of the proposed QF contract, and no adjustment is made to cap the energy payment stream at the assumed fuel price of the avoided CCCT.

Q. What is the second issue?

A. UCE makes additional recommendations for valuing one component of the

perceived risk mitigation benefits of renewable QFs previously identified in UCE's direct testimony.

Q. How do you respond?

A. Opposition to the risk adder proposed by UCE was articulated in rebuttal testimony from DPU, OCS, and the Company. Adding a quantification of one piece of the risk adder in rebuttal testimony does not change the fundamental inappropriateness of the concept.

Q. Do you have any response to the comments from Sun Edison?

A. Yes. Sun Edison's comments not only come late in the process, they are riddled with false statements which include the following:

- Sun Edison claims that the capacity contribution method proposed by the Company is the CFAM. It is not. Based on this erroneous assumption, Sun Edison mistakenly concludes that the Company incorrectly calculated the capacity contribution. I have previously demonstrated why the CFAM is inappropriate for determining the capacity contribution a QF makes to the system coincident peak load for purposes of avoided cost pricing.

- Sun Edison claims that a ninety-percent exceedance probability (P-90) is inconsistent with resource planning and a fifty-percent exceedance probability (P-50) is how other peak generation resources are calculated. These claims are incorrect. Resource capacities in the Company's IRP load and resource balance are stated at their maximum dependable capacity, and the capacity contribution of renewable resources evaluated in the Company's 2013 IRP was calculated using the capacity method proposed by the Company in this case. A P-50 is more appropriate for energy planning, but is not appropriate for peak planning.

- Sun Edison claims that the exceedance method proposed by the Company measures how often a resource is available rather than whether the resource will be available when the system most needs it. Figure 2 demonstrates that the exceedance method is the most appropriate method to identify resource availability when the system most needs it.

- Sun Edison claims that the capacity value for solar projects located in Utah are incorrectly low compared to the five-state average used by the Company. However, the graphic presented on page 8 of Sun Edison's comments does not provide any evidence about the timing of the solar output in relationship to PacifiCorp's coincident peak load. Therefore the claim is unsupported by the evidence.

- Sun Edison claims that the solar output for QFs in Utah should be compared to Utah load. This claim does not recognize the integrated nature of PacifiCorp's system nor does it recognize that nearly 70 percent of the top 100 hours for PacifiCorp's system are also the top 100 hours for Utah reflecting the fact that Utah has a significant summer peak and is PacifiCorp's largest jurisdiction.

- Sun Edison claims that PacifiCorp did not adjust the PVWatts data for daylight savings time causing a mismatch between the solar output and the hourly loads and underestimating the production and capacity factor of solar resources during the higher load events. This is incorrect. The Company stated both the PVWatts data and load data in PPT and illustrated in Figure 2.

- Sun Edison claims that once a new CCCT comes online in the Proxy/PDDRR method, that energy costs are based on the fuel cost of the deferred CCCT. As discussed above in response to UCE testimony, this claim is simply incorrect.

Given the number of false statements contained in Sun Edison's comments and the timing of its filing, the Company recommends that anything Sun Edison states in its comments should be heavily discounted.

Q. Does this conclude your surrebuttal testimony?

A. Yes.