Q. Please state your name and business address.

A. My name is Kenneth T. Houston. My business address is 700 N.E. Multnomah, Suite 550, Portland, Oregon 97232.

Q. For whom do you work?

A. I am Director, Transmission Development for PacifiCorp. In my role, my group is responsible for FERC Open Access Transmission Tariff (OATT) compliance, including responding to customer requests for interconnection to the Company's transmission system. My department also reviews and responds to customer requests for transmission service on the Company's transmission system.

Purpose of Testimony

Q. What is the purpose of your testimony?

A. I will be responding to a number of questions posed by the Commission staff in their memorandum dated January 19, 2006 in relation to the impact of Qualifying Facilities (QF) on Avoided Transmission Capacity Costs and Avoided Transmission Losses. Additionally, my testimony addresses and supports the Company's position paper provided to the Commission sponsored Transmission Workgroup in November 2005. Mr. Griswold will address the methodology for calculating the cost or savings for line loss adjustments to avoided costs in his direct testimony.

Responses to questions by Commission staff

Q. What is a typical period of analysis in an interconnection study?

A. The OATT defines the standard procedure and process for reviewing and responding to a Large Interconnection Agreement (LGIA) or a Small Generation

Interconnection (SGIA) hereby referred to as the "interconnection request". A Transmission System Impact Study (SIS) is conducted for every interconnection request received by the Company whether the interconnection request qualifies under the OATT or as a QF. The SIS analyzes the proposed interconnection request's impact on the transmission system with the configuration and conditions existing at the time of the interconnection request application. The study and resulting requirements are valid only for that point in time. FERC requires each interconnection request to be studied sequentially, including requests from PacifiCorp's merchant function, regardless of whether the generator is a wholesale generator or a QF, based upon request date with requirements assigned accordingly. The Company includes planned system modifications to the transmission system with in-service dates prior to the proposed interconnection date. Planned modifications to meet load growth and reliability standards are taken into account during the SIS.

Q. Why is 10 years of data requested of an applicant for the integration impact study but only 5 years proposed for analyzing transmission avoided costs?

A. Network Customers of PacifiCorp Transmission are obligated to provide ten (10) years of load and resource (L&R) data on an annual basis. The L&R data is required to ensure the Company has sufficient transmission capability to reliably serve future loads, over the ten year horizon, for all network customers using the Company's system.

Similarly, the Company's Integrated Resource Plan (IRP) utilizes a 20-year planning horizon and identifies future generation and transmission additions over

the first 10 years of that planning horizon. It is well understood that some types of resources require long planning lead times to site, permit, and construct. Without developing a resource portfolio over a ten year planning horizon, certain resources may not be considered as part of the Company's IRP. This type of transmission and resource planning described above is done at a relatively high level to help inform the Company about the need and timing of taking specific action to add new generating or transmission facilities to the system.

The Company has proposed a five (5) year transmission planning horizon to determine the avoided transmission costs and losses associated with new QFs for the following reasons. First, the transmission network is a highly complex system and will dynamically change over the course of a few years depending on several factors. These factors include variation of loads that are added and removed from the network systems, generation sources that are added and removed, reliability requirements may change, and third party usage of the network may also change. As the network changes, so does the impact a QF might have on the system. The Company proposed a five year horizon due to these uncertainties on the planning horizon and to insure reliability is not negatively impacted within the existing system.

Q. What is the difference between the integration system impact study (referred to in item 4 of the Company's proposed process) and the interconnection system impact study (referred to in item 5 of the Company's proposed process)?

A. Item 4 of the Company's proposal defines the difference between an

interconnection request to interconnect the generator to the system and a request to integrate the generator from the point of interconnection into the system to serve network load. As previously stated, an Interconnection Study defines the requirements to reliably interconnect a new generator to the Company's system whether it is a QF or not. An "integration study" defines the impacts of the proposed resource on the operation of the transmission system and any requirements necessary to meet load or a Transmission Customer's request to move energy from a point of receipt to a point of delivery. When PacifiCorp's merchant function, requests the integration of a QF as a Network Resource, PacifiCorp's transmission function will conduct a study to identify both the requirements and upgrades necessary on the system to reliably integrate, and deliver the generator output to the network load.

Q. There is also mention in the Company's FERC Open Access Transmission Tariff (OATT) of the Transmission System Impact Study. How does this study differ from the other two studies and what is its study time horizon.

A. The Transmission System Impact Study or "SIS" is the same as the study relating to integration referred to in the previous question. The two terms are used interchangeably at the wholesale level. A SIS assesses the requirements necessary to reserve transmission capacity on the Company's system for delivery of energy to load.

Q. In its FERC OATT, does the Company limit interconnection to 138 kV lines?

A. No. Studies seek to identify the most effective interconnection voltage with consideration given to other system factors. The cost of the interconnection with

consideration given to overall impacts and the anticipated overall reliability level are two major factors considered.

Q. PacifiCorp proposes that savings be based on the net transmission benefits or costs that the QF provides to PacifiCorp when integrated as a Network Resource into the system. Please describe the standard methodology and the standardized set of system models that are used for the studies that determine these costs and benefits.

A. Transmission Network Resource studies use base cases prepared by the Western Electricity Coordinating Council (WECC) as the standardized set of system models. Changes are made to the model to add more detail to the sub-transmission representation (46 to 138kV) and to adjust load distribution. Power flow studies, using the Power Technologies Inc. (PTI) program, are then conducted to determine the system impact of adding the facility in question.

Q. Please explain the topology of the transmission system as it is represented in the Company's interconnection or integration models described in the previous question.

A. The WECC base cases used in these studies represent the generating plants, load distributions, and facilities for all utilities in the western U.S. and Canada. These cases are prepared for various years, seasons and loading conditions. Not all utilities represent the sub-transmission facilities in detail. The Company adds in the necessary detailed representation for the cases that are used for the interconnection and integration studies.

Q. Please explain the difference between PacifiCorp's 5-year detailed transmission plan and its IRP transmission plan. Does PacifiCorp have other "transmission plans"?

A. The 5-year detailed transmission plans show additions that are required to serve the projected load requirements. These transmission plans are for facilities of 138 kV and below and are detailed enough to determine specific substation equipment and transmission line additions. The five year transmission plan is used to support investment decisions.

The IRP, on the other hand, identifies various resource and transmission additions that could be added to meet total system load requirements on a least cost, least risk basis. The transmission costs in the IRP are very "high-level" estimates of main-grid transmission and do not consider facilities below 138 kV. The focus of the IRP is to make economic comparisons of a variety of resource and transmission portfolios over a 10-year horizon. As mentioned above, these studies are used to inform future actions and are not used to make decisions about investing in specific generation or transmission facilities. These "transmission plans" are not detailed plans and may change as each new IRP is developed. The Company does prepare other "transmission plans" which are more accurately represented as studies prepared in response to transmission service requests by third-party transmission entities. The level of detail of these studies varies depending on the type of study (feasibility or facility study).

Q. In the Company's FERC OATT, it appears that PacifiCorp may "cluster" study requests and prorate costs among the cluster. What does this entail and to what extent is this done?

A. The FERC interconnection procedures define a cluster study process. The Company does not utilize this process due to the size of PacifiCorp's system and the scattered nature and timing of the requests previously received and studied in the Company's interconnection queue. Projects which are not similarly located geographically would not benefit from a cluster analysis. Accordingly, very little attention has been given to defining the associated cluster study process and the process for any allocation of costs.

Avoided Transmission Losses

Q. When integrated as a Network Resource it appears that the network resource must purchase losses per the Company's OATT network tariff. Is this correct?

A. No. Under the OATT, only Transmission Customers pay average system losses by either generating sufficient amounts to account for losses or paying for losses at market rates. As a Network Resource the generator is not a Transmission Customer and therefore is not responsible for losses. Sections 15.7 and 28.5 of the OATT make the Transmission Customer responsible for the losses stated in Schedule 9 of the OATT. Schedule 9 sets out an average transmission system loss factor of 4.48 percent. In the case of Network Service, this loss factor is applied to the metered load and is not responsibility of the Network Resource. The average system losses assessed against network load would be the same whether

the Network Resource were a QF or not.

Q. How are losses calculated and costs allocated to Network Resources?

A. Total system average losses were calculated in a 1991 loss study. These rates were validated in the 1996 rate case when the current FERC rates were established. These loss factors are applied to metered load for Network Service and to the amount scheduled to a point of delivery for Point-to-Point Service.

Q. Under what conditions of power delivery are losses charged or not charged or allocated to a network resource?

A. All Transmission Customers must supply or are charged for losses based on load not on generation resources. A Transmission Customer must generate incremental energy in real time to supply losses, or they are assessed for losses as part of energy imbalance and must then pay for the losses at market energy prices.

Q. Are losses charged to a Network Resource for: a) non-firm power; b) the wind proxy contract customer; c) must-run resources; d) fully dispatchable power; e) firm power?

A. All losses are charged to Transmission Customers at the rate set forth in Schedule 9 of the Company's OATT based on load.

Company's Proposal

Q. The FERC interconnection study procedure does not include the avoided cost studies outlined in the Company's proposal, how can this be reconciled with the requirement and time frame for completing the OATT studies?

A. QF interconnections are not governed by FERC, however the Company has chosen to study them using the FERC interconnection procedure. Using a

common procedure eliminates confusion. In many cases customers may not have determined their ultimate status as a QF or some other type of resource until later in the study process. The Company and the customer can choose to add study details and additional time to the standard study upon mutual agreement. This modification would be allowed under the FERC process. In addition, PacifiCorp utilizes the FERC procedure in recognition of the fact that a QF can switch between QF status and exempt wholesale generator status. The ultimate goal of the process is to provide customers with timely and accurate information so project decisions can progress.

Q. Why does the Company propose to use the OATT interconnection process for the Avoided Cost study?

A. Each interconnection request currently requires both an interconnection and integration study to be conducted. The intent of the study is to provide the customer with information about the ultimate costs of interconnection at a specific location such that the customer can make a business decision about moving forward. Identification of any additional savings in transmission costs and the resulting payment to the customer is very much related to defining a project's viability.

Q. Is the Company's proposal for QF treatment consistent with how it studies any resource addition?

A. Yes, the same reliability criteria will be applied to QF interconnections studies as are applied to other interconnected base load generation.

Q. Why should avoided costs be identified on a case by case basis?

A. Each installation is unique and a specific study is necessary to determine whether any transmission costs are actually avoided or if there are incremental costs incurred. While use of a pro-rata calculation or blanket approach may be easier to administer, it is surely inaccurate and would therefore not meet the indifference standard. Furthermore, if the avoided costs were assessed on an IRP based avoided cost methodology rather than being assessed on its own merits, other system users (including energy consumers) could eventually be faced with higher costs.

The Company believes QFs will have minimal impact on the need for major transmission investment. The Company plans its transmission system to reliably serve its load. Often that planning results in the need for new transmission lines and acquisition of new transmission rights-of-way. In order to responsibly use the limited amount of transmission rights-of-way that can be obtained, it is the Company's obligation to maximize the capability of these new transmission lines. Unless a QF completely eliminates the need for a new transmission line, the Company would not likely construct a transmission line of lesser capability. Since the QF will be able to cease generating for normal maintenance and during unplanned outages, the Company will need to prudently plan transmission construction assuming that at times individual resources, including a QF may not be able to generate electricity. Without adequate transmission to load areas, during times of such QF outages, the Company may need to curtail load or to place certain loads on automated tripping schemes.

The only way to verify the affects of a QF on transmission planning is to specifically analyze each situation on its own merits to determine what effect (if any) a QF as a replacement (or a deferment) of an alternative resource will have on planned transmission resources. It must be noted that the use of a QF in such a situation may be neutral in relationship to the Company's future transmission investments. However, such an analysis may show that the QF either decreases future transmission investments or possibly increases future transmission investments.

Lastly, if a pro-rated approach were endorsed, it will cause a QF to be paid in cases where transmission is still required for reliability reasons. In these cases, ratepayers would be required to pay for duplicate or overlapping resources. This would violate the ratepayer neutrality or indifference standard.

Q. How do Company owned resources and the associated transmission network support reliable operation of the network?

A. There are numerous reliability functions provided by Company owned generation resources and robust transmission connections are required to maintain reliability. Sole reliance on QF resources without the associated transmission infrastructure would not meet these needs. Conversely most major planned transmission would most likely be required regardless of whether a QF interconnects to the system, or not. The Company's transmission upgrades are required in some instances to bring distant generating resources to load areas but are often driven by load growth and the need to reliably serve this load. Resources locating close to load areas may have an affect on the planned dispatch of the system; however, during

times when these resources cannot deliver electricity to the system due to scheduled or forced outages, the Company must still endeavor to reliably serve this load. This can only be done by importing the output of other resources to the various load area over a well planned transmission grid.

Q. How do resources and the transmission system together affect reserve requirements?

A. Each second of the day, loads instantaneously change as electricity consumers switch processes on and off. In aggregate, consumers' needs require the Company to match generation output levels with load requirements on an instantaneous (or real-time) basis. This reliability function is known as regulation. The Company must maintain adequate resources directly under automatic generation control to meet the instantaneous changes in loads. Hour to hour load changes of the system also require the Company to maintain adequate responsive resources to meet the daily load curve on the system. The daily shift from minimum loading to peak loading can be significant and Company owned resource or purchased resources with optionality must be maintained to serve daily load curves. Generation reserves must also be maintained to support the potential loss of actual load serving generation in real time. Actual capacity requirements are established by reliability coordinators, however specific generation resources are required to be maintained on line with additional capacity margins available in the event another generator is lost on a forced outage. Transmission capacity margins must be maintained from the reserve resources to the load pockets. The addition of QFs to a load pocket can

exacerbate an area's reserve requirements and the associated transmission requirements since QFs would not typically supply a portion of their output as qualified reserves.

To summarize, the addition of a QF to the system does not avoid all planned generation resources and transmission investments, particularly those providing reserve capacity and reliability support. Even if it can be shown that the costs of planned generation resources can be avoided, little if any planned main grid transmission developments may be avoided. Once the Company determines that it must build a new transmission line, it has a public obligation to get as much capability as it can from the upgrade and associated right-of-way corridor. A transmission right-of-way is a scarce commodity and when acquired should be used to its maximum capability.

Q. What reliability impacts do generators have on the Transmission System that require transmission support?

A. There are certain services that a transmission system needs in order to maintain system stability and security. The default provider of these services is PacifiCorp's merchant function. These include, among others, reactive power, voltage stabilization, regulation, reserves, and black start. These services are provided by the Company's generators as they cannot effectively be provided by a QF due to their smaller size or due to the fact that they may have a requirement to supply process steam to a host that negates the QF's ability to self-supply those services. Furthermore, those services can only be reliably supplied by a robust transmission system the Company's generation through the transmission system.

In such cases, transmission costs are not avoided.

Q. Are there any other reliability concerns for using QF resources to serve loads?

A. Yes. The Company proposes to study each installation independently where an effective assessment of a specific QF's reliability can be made. For QFs to displace planned transmission, the QF must be reliable and dispatchable. If the QF is not reliable and dispatchable and transmission is not constructed, it is possible that load would need to be shed to maintain system stability during QF outages or reduction in anticipated generating levels. The study and assessment of each QF's reliability levels, ability to support voltage and reactive requirements, and the need for any associated transmission in support of the networks overall reliability is essential.

Q. Why does the PacifiCorp proposal limit the transmission line voltage which might qualify for avoided cost payment to 138 kV.

A. As previously described, reliability requirements can be a major factor in determining if major transmission lines are constructed. The addition of a QF to a load pocket is not expected to change the need for a major transmission line. A QF addition has a much higher probability of deferring or avoiding sub-transmission requirements, such as 138 kV and below. The Company's proposal would include a modified system impact study during the interconnection process whereby a system study would determine the transmission requirements with and without the QF to reliably serve the load. Any transmission that can be avoided or deferred would be eligible for an avoided cost payment to the developer. The

Company does not believe a QF smaller than 100 MW would have any impact on the need for a major transmission line in excess of 138 kV and has proposed higher voltages to be excluded from any study. High-voltage transmission improvements provide capacity increases in large blocks. The QF generating additions are generally small and do not match the transmission improvements. Sub-transmission and distribution facility additions, on the other hand, will match up better with the smaller generation additions. Because of the interconnected nature of the network and the high capacity of the main grid facilities, the high-voltage transmission lines are not greatly impacted by the addition or loss of smaller generating plants even if they are located near the load center. This impact is much greater on the local sub-transmission and distribution. The planning of high-voltage transmission additions has a greater degree of uncertainty than local facilities. Local sub-transmission and distribution facility additions are driven by known load additions for the most part and very likely to occur. QF generators that are added to the sub-transmission system (<138 kV) are much more likely to significantly change these planned additions. For example, a 20 MW generator would be 40 percent of the loading on a 50 MW circuit serving a particular area. The main grid transmission network serving the load center is only slightly affected by these small generators. To illustrate, a 20 MW generator on a main-grid transmission system with a capacity of 4000 MW is only 0.5 percent of the loading. High-voltage facilities, on the other hand, are driven by large resource additions of up to 500 MW which are fairly uncertain. A change in location of these large resources can completely change the transmission plan.

The addition of small QF generators would have very little impact on the scope or timing of these high-voltage transmission plans.

Q. Does PacifiCorp's proposal apply to distribution interconnection QFs?

A. Yes. The interconnection of a QF to PacifiCorp's distribution system is generally limited to smaller QF projects, most of which are less than 5MW nameplate. If a QF in Utah (of 3 MW or greater) has requested to be interconnected at distribution level and the interconnection study supports interconnection at the distribution level, then PacifiCorp would offer similar studies relating to the distribution system to identify any avoided costs or cost savings associated with a QF interconnecting into the distribution system. Those QF projects less than 3 MW nameplate receive standard avoided cost prices and contract terms per Schedule 37 and are not eligible for price adjustments related to transmission savings or costs. However, regardless of the QF, MW capacity and interconnection voltage, they still must comply with the Company's interconnection process.

Q. Does this conclude your testimony?

A. Yes, it does.