PACIFIC POWER
A DIVISION OF PACIFICORP

825 NE Multnomah, Suite 2000
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April 7, 2009

VIA ELECTRONIC FILING
AND OVERNIGHT DELIVERY

Oregon Public Utility Commission
Attention: Filing Center
550 Capitol Street NE, Suite 215
Salem, OR 97310-2551

Attn: Filing Center
Re: **UM 1355** – Direct Testimony of PacifiCorp

PacifiCorp (dba Pacific Power) submits for filing an original and five (5) copies of its direct testimony in the above-referenced matter.

PacifiCorp is submitting direct testimony by the following witnesses on the Consolidated Issues List adopted in this proceeding.

- David J. Godfrey, Director, Asset Management and Compliance, addresses forecasting methodologies related to thermal generating plants.
- Mark Smith, Director, Generation Planning, discusses the Company's proposed methodologies related to hydro generating plants.
- Mark R. Tallman, Vice President, Renewable Resource Acquisition, discusses the Company's proposed methodology related to wind resources.

PacifiCorp respectfully requests that all data requests regarding this matter be addressed to:

By e-mail (preferred): datarequest@pacificorp.com

By regular mail: Data Request Response Center
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Please direct informal correspondence and questions regarding this filing to Joelle Steward, Regulatory Manager, at (503) 813-5542.

Very truly yours,

Andrea Kelly / [illegible]

Andrea L. Kelly
Vice President, Regulation

Enclosures
cc: UM 1355 Service List

CERTIFICATE OF SERVICE

I hereby certify that I served a true and correct copy of the foregoing document on the date indicated below by email and/or US mail, addressed to said parties at his or her last-known address(es) indicated below.

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DATED: April 7, 2009.

Ariel Son
Coordinator, Administrative Services

Docket No. UM-1355
Exhibit PPL/100
Witness: David J. Godfrey

BEFORE THE PUBLIC UTILITY COMMISSION

OF THE STATE OF OREGON

PACIFICORP

Direct Testimony of David J. Godfrey

April 2009

Q. Please state your name, business address and present position with PacifiCorp (the Company).

A. My name is David J. Godfrey. My business address is 1407 West North Temple, Suite 320, Salt Lake City, Utah. My position is currently the director, asset management and compliance for PacifiCorp Energy.

Qualifications

Q. Please describe your education and business experience.

A. I have a Bachelor of Science degree in Mechanical Engineering from Brigham Young University. I have worked in the electric industry for almost 26 years. I have spent the bulk of my career in various engineering and management positions. I started out with the Company performing design studies and small project management for power plant improvement projects and filled many positions with increasing responsibility in the generation organization. In 2001, I became the Director of Asset Management for generation with responsibilities for the development of strategic asset plans and risk management plans for the generation fleet. I also oversee the management of the Company's Availability Information System and the compliance efforts for PacifiCorp Energy with the North American Electric Reliability Corporation Reliability standards.

Q. What is the purpose of your testimony?

A. I will respond to items in Issue I on the Consolidated Issues List adopted in this proceeding. Specifically, I explain the Company's proposals for the following:

- The recommended forecasting methodology for equivalent unplanned outage factors for thermal plants (Issue I), including the difference between flexible and baseload units (Issue I.A.).

- What outages should be included in equivalent unplanned outage factors (Issue I.B.).
- The appropriate methodology for calculating equivalent unplanned outage factors (Issue I.D.).
- How new resources should be treated in the forecasting methodology (Issue I.E.).
- What the appropriate length of time is to use for historical periods (Issue I. F.).
- Whether factors should be adjusted to account for capital investments that improve reliability (Issue I.H.).

Forecasting Methodology (Issue I.A.)

Q. What forecasting methodology does the Company propose to use for thermal baseload generating plants?

A. The purpose for forecasting forced outage rates for electric generating units is to provide an input to corporate models to quantify the available generation to serve load. With this goal in mind, focusing solely on forced outage rate may not produce the desired outcome given that forced outage rate is but one of many categories of plant unavailability. Therefore, the company proposes that an historical average of Equivalent Unplanned Outage Factor ("EUOF") be used to determine plant availability for forecasting purposes. The EUOF is defined later in my testimony. Given the fact that unplanned and maintenance outages occur as random events and cannot be predicted with any certainty as to when they will occur in the future, the Company further proposes that the historical average EUOF be applied to each hour of a baseload generation unit that is not scheduled as a planned outage or as a planned de-rate.

Q. Should there be a different methodology for flexible-resource units versus base-load plants?

A. Yes. Flexible-resource units usually have a significant amount of reserve shutdown hours that can potentially skew the statistics. The Company proposes that an historical average of Equivalent Unplanned Outage Rate ("EUOR"), as defined later in my testimony, be used for flexible resource units to determine plant availability for forecasting purposes. Using a rate in this instance, as opposed to a factor, removes the effect of significant reserve shutdown hours and gives a more realistic forecasting value. Given the fact that unplanned and maintenance outages occur as random events and cannot be predicted with any certainty, the Company further proposes that the historical average EUOR be applied to each hour of the flexible unit that is not scheduled as a planned outage, as a planned de-rate or a reserve shutdown hour.

Relevant Events (Issue I.B.)

Q. What events should be included in calculating availability statistics?

A. The Company believes that all events should be included in the calculation of availability statistics.

Q. Please provide the reasoning for your response?

A. When operating a fleet of generating plants there are anomalous events that occur. These anomalous events occur randomly across the fleet. If an event at a unit is excluded from the historical average, due to its anomalous characteristics, it artificially affects the historical and therefore, forecasted availability of the fleet. It is like owning ten cars and ignoring the repair costs and time to change the tires because they are not annual events and they occur at different times for each car based on mileage. The Company supports keeping all events in the historical number to reflect the actual availability of the units and therefore, the fleet.

Calculating Methodology (Issue I.D.)

Q. How does the Company propose to calculate its availability statistics?

A. The Company proposes to use accepted and established North American Electric Reliability Corporation/Generating Availability Data System ("NERC/GADS")statistics and terms.

Q. Please provide the formulas for these NERC/GADS statistics.

A. Equivalent Unplanned Outage Factor

$$EUOF = \frac{MOH + FOH + EMDH + EFDH}{PH} \times 100$$

Where:

MOH = Maintenance outage hours

FOH = Forced outage hours

EMDH = Equivalent maintenance derated hours

EFDH = Equivalent forced derated hours

PH = Period hours

Equivalent Planned Outage Factor

$$EPOF = \frac{POH + EPDH}{PH} \times 100$$

Where:

POH = Planned outage hours

EPDH = Equivalent planned derated hours

PH = Period hours

Equivalent Unplanned Outage Rate

$$EUOR = \frac{FOH + EFDH + MOH + EMDH}{PFOH + MOH + SH + Synchronous\ Hrs + Pumping\ Hrs + EFDHRS + EMDHRS} \times 100$$

Where:

FOH = Forced outage hours

EFDH = Equivalent forced derated hours

MOH = Maintenance outage hours

EMDH = Equivalent maintenance derated hours

EFDHRS = Equivalent forced derated hours during reserve shutdowns

EMDHRS = Equivalent maintenance derated hours during reserve shutdowns

Q. Does the Company have any comments about using NERC/GADS terms.

A. Yes. The Company strongly urges the use of standard NERC/GADS terms when talking about availability and statistics. By using the defined terms provided by NERC/GADS it will avoid confusion and misunderstanding among all parties.

New Resources (Issue I.E.)

Q. What does the Company propose to use to forecast availability for new resources for which there is no historical data?

A. The Company proposes to use the manufacturer's or project guarantee for the first year. Then as actual operating data is collected, it would be used as the first year of historical data in calculating the four-year historical average. The actual data during the first year of operation is skewed by normal start-up issues. By eliminating this data from the historical average it reflects a more realistic operating profile for the resource.

Historical Timeframes (Issue I.F.)

Q. The Company proposes to use an historical basis for forecasting plant unavailability. What timeframe does the Company propose?

A. The Company proposes to use a four-year historical average when computing the statistics for forecasting purposes. The reasoning behind the four-year average, over any other timeframe, is that a four-year average helps to smooth the effects of the planned outages (most of the Company's plants are on four-year overhaul intervals); thereby reducing the volatility of the EPOF and the EUOF factors. This is consistent with the Commission practice of normalizing costs for ratemaking.

Capital Investments (Issue I.H.)

Q. How should forecasted availability be modified for capital investments that improve availability?

A. The Company proposes that no adjustments be made in the forecast for capital projects that improve future availability. Rather, the Company proposes to capture the actual benefits by using the historical data. In this manner the true benefits will be reflected in the data.

Conclusion

Q. Please summarize your conclusions.

A. The Company feels that using the historical averaging methodology as described above is a reasonable and fair approximation to use in forecasting. Furthermore, the Company does not agree with the practice of removing events from historical data in calculating averages, as it can negatively bias the results downward. Finally, the Company strongly urges the use of standard NERC/GADS formulas and terms when calculating statistics.

Q. Does this conclude your testimony?

A. Yes.

Docket No. UM-1355
Exhibit PPL/200
Witness: Mark H. Smith

BEFORE THE PUBLIC UTILITY COMMISSION

OF THE STATE OF OREGON

PACIFICORP

Direct Testimony of Mark H. Smith

April 2009

Q. Please state your name, business address and present position with PacifiCorp (the Company).

A. My name is Mark H. Smith. My business address is 825 NE Multnomah Street, Suite 600, Portland, Oregon 97232. My position is currently the Director, Generation Planning.

Qualifications

Q. Please describe your education and business experience.

A. I hold a Bachelor of Science degree in Geography from Portland State University. I have been employed by PacifiCorp in Portland, Oregon since 1981. Since that time I have held a variety of positions including Hydro Scheduling, Resource Planning, and Power System Modeling, working for the majority of my career in the field of hydroelectric generation and water management. I have been in my current position since October 2001.

Q. What are your responsibilities as Director, Generation Planning?

A. I am currently responsible for daily power generation scheduling of hydro, thermal and wind generation resources; long range generation planning and forecasting; and water management with respect to Company's hydroelectric projects. I am responsible for operational and water management decisions that include Company's commitment to resource stewardship and obligation to minimize generation costs to customers.

Q. What is the purpose of your testimony?

A. My testimony addresses Issues II and IV related to hydro resources on the Consolidated Issues List adopted in this proceeding. Specifically, I explain:

- Types and causes of outages;
- Impact of outages;
- Modeling outages for rate-setting purposes..

Q. What types of outages occur for hydro resources?

A. Similar to thermal generation resources, hydro generation resources require planned outages for periodical maintenance. Hydro resources can also be forced off-line due to various uncontrollable factors. My discussion in the following will focus mainly on forced outages.

Q. What are forced outages?

A. During normal operation of the Company's hydroelectric projects there are many instances where units are forced off-line or must unexpectedly be taken off-line for a variety of reasons. Those outages can be classified as forced outages. The cause of a forced outage can vary widely and could be attributable to mechanical issues, environmental requirements, weather conditions, geological hazards, the transmission system, safety, and local emergencies in river reaches, power canals, reservoirs etc.

Q. Why should forced outages be considered for hydro resources?

A. Forced outages impact both hydro projects with storage capacity and run-of-river projects which do not have storage. For projects with sufficient storage capacity, a forced outage would not necessarily result in lost generation, but depending upon available inflow the forced outage could result in reduced shaping capability which could lower the value of remaining generation capacity. Lost generation associated with forced outages cannot be ignored. However, is very difficult to accurately model hydroelectric generator forced outages and related physical and financial impacts to production due to many variables including inflow volatility, operating requirements or other unpredictable circumstances. Those circumstances can be related to reliability of generating facilities, or in many cases, related to factors not attributable to generating equipment failure. In both cases, outage events are random and can impact generating capacity and energy production. Based on 2007 data, the North American Electric Reliability Corporation (NERC) reports a forced outage rate for small hydroelectric units with capacity between 1 to 29 megawatts of 7.90 percent while the forced outage rate for large hydroelectric units with a capacity of 30 megawatts or higher is 3.81 percent.

Q. How do outages on hydro resources impact the generation from those resources?

A. The impact of a forced outage is not consistent across all of the Company's hydroelectric projects and varies based on number of generating units available at the affected facility; current hydrologic conditions; available reservoir or forebay storage; and downstream flow requirements. For run of river projects with a single unit, such as Iron Gate, any forced outage will result in a loss of generation as water must be spilled past the unavailable turbine. At run of river projects with multiple units, the amount of spill past unloaded units depends on the current flow in the river and the hydraulic capacity of the remaining units. When river flows are greater than the hydraulic capacity of the remaining units, spill will be incurred along with a loss of generation.

Forced outages can have less of an impact at projects with upstream storage capacity such as Swift No. 1. Depending on the length of the forced outage and the downstream flow requirements, water can sometimes be stored for future use resulting in no loss of generation. However, if inflow is greater than the remaining storage capacity of a project, water must be spilled past the unavailable unit that results in loss of generation. In the circumstance when water is stored for future use, that can result in financial impacts to the value of future generation. The resulting value is dependent upon current and future market conditions at the time of the outage

Q. Are all forced outages of hydro resource necessarily related to mechanical failures?

A. No. There are also instances where the generation from hydro resources is reduced or changed because of uncontrollable non-mechanical factors.

Q. Please give some examples of forced outages of hydro resources due to non-mechanical failures.

A. In early September 2008, a portion of the North Umpqua hydro project was forced offline as wildfires threatened transmission lines and the safety of fire fighting crews and equipment. Despite having some storage capacity, the project was forced into spill to maintain downstream flow requirements. Between December 28, 2008 and December 31, 2008 the Prospect No. 2 project on the Rogue River was forced to reduce generation due to a high runoff event that caused debris accumulation on the intake racks. This project is run of river and water otherwise available for generation was spilled.

Q. Does the Company model outages of hydro resources?

A. Yes. The Company models both planned and forced outages of hydro resources for ratemaking purposes. The resources are modeled differently depending on whether it is a run of river facility or has storage capability.

Q. Is the Company's modeling of hydro outages comparable to an industry standard?

A. The Company is not aware of any industry standard for modeling hydro outages.

Q. Please explain how the Company models outages for run of river resources.

A. For run of river resources, the Company models generation based on the historical average, which includes the historical planned and forced outages.

Q. Please explain how the Company models the outages of the hydro resources with storage capabilities.

A. For planned outages, the Company models the resource as unavailable during the planned outage periods. At present, the Company models forced outages the same way as planned outages, by extending the outage duration to include the hours that the resource was not available historically due to forced outages. This technique is different from modeling forced outages of the thermal units where the capacities of the units are reduced based on forced outage rates. Based on a rolling 48-month historical record, the average number of days lost due to forced outage is combined with the average number of days lost due to scheduled outage on a monthly basis, which determines the length of the combined outage. The schedule of the combined outage is based on certain decision criteria, such as limited number of outages during the 48-month test period.

Q. Can forced outages of hydro resources be modeled in the same way as modeled for thermal resources?

A. No. Hydro resources, especially those with reservoir storage capacity, are built for different reasons due to the inherent flexibility of their operating capabilities. They provide capacity and shaping of energy. Outages may or may not lead to loss of energy. Therefore, the same measurements for the thermal generating resources may not apply in the case of hydro generating resources.

Q. Do you believe the Company's current methodology understates the impact of hydro outages?

A. Yes, and this may be true for both planned and forced outages.

Q. Please explain why the impact of planned outages is understated when the timing is controlled by the Company.

A. Aside from the fact that planned outages may not actually occur as planned, the Company uses the 48-month average historical outages in the test period. In that 48-month period, a hydro resource could have one prolonged outage for major overhaul and no planned outages for the remainder of the period. By averaging the length of the outage, the impact of spilling water is minimized or eliminated because the average outage may make it possible for the limited storage at the hydro resource to store the water during the shorter outage.

Q. Please explain why the impact of forced outages is understated.

A. The fact that the Company is modeling forced outages the same way as planned outages makes an unpredictable event predictable. This predictability results in reshaping and optimization of the energy available. Because hydro optimization models employ perfect foresight, the result is a planned operation that is very difficult if not impossible to execute in real time operations.

Q. What is your conclusion from the above discussion?

A. I believe that it is appropriate to model both the planned and forced outages of hydro resources because they are both legitimate types of outages that occur in normal operation. The normalized generation capability of the Company's hydro resources has been overstated due to over-optimization of available generation resulting from pre-determined stream flow and unit availability that is difficult if not impossible to deliver in real time. Stream flow available to the projects in real time is extremely volatile and unpredictable and subsequently difficult to capture optimal generation. Unit availability can change unexpectedly and without sufficient notice to plan around. In addition, difficulties in precisely measuring and understanding the impacts of recent FERC license constraints and operating policies that impact the operation of generating resource together have led to overstated generation from certain projects. These are some factors that impact modeled hydro generation. Since there is currently not an industry standard for modeling the effects of forced outages on hydro resources, the impact of hydro outages is difficult to quantify looking forward. The Company is open to discussions on improvements to its methodology for modeling of hydro outages.

Q. Does this conclude your testimony?

A. Yes.

Docket No. UM-1355
Exhibit PPL/300
Witness: Mark R. Tallman

BEFORE THE PUBLIC UTILITY COMMISSION

OF THE STATE OF OREGON

PACIFICORP

Direct Testimony of Mark R. Tallman

April 2009

Q. Please state your name, business address and present position with PacifiCorp (the Company).

A. My name is Mark R. Tallman. My business address is 825 NE Multnomah, Suite 2000, Portland, Oregon 97232. My present position is Vice President of Renewable Resource Acquisition.

Qualifications

Q. Briefly describe your education and business experience.

A. I have a Bachelor of Science Degree in Electrical Engineering from Oregon State University and a Masters of Business Administration from City University. I am also a Registered Professional Engineer in the states of Oregon and Washington. I have been the Vice President of Renewable Resource Acquisition since December 2007. Prior to that, I was Managing Director of Renewable Resource Acquisition from April 2006 to December 2007. I have worked at the Company for more than 23 years in a variety of positions of increasing responsibility, including the commercial and trading organization; the Company's engineering organization; the retail distribution organization; and five years as a District Manager.

Purpose of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to describe the Company's position with respect to forecasting availability rates, planned maintenance and outage reporting for wind-powered generation resources.

Testimony Summary

Q. Please summarize your testimony?

A. My testimony describes how the Company currently incorporates forecasted forced outage rates for wind-powered generation resources in net power costs and why the Company's current method of utilizing the forecasted energy production profile resulting from technical studies should be considered by the Commission to be the appropriate methodology for incorporating wind-powered resource availability when setting just and reasonable rates.

Consolidated Issues List

Q. In the consolidated issues list for this docket, what are the specific issue questions put forth with respect to wind-powered generation resources?

A. The consolidated issues list poses three questions with respect to wind-powered generation resources: Issue III addresses availability forecasts; Issue IV addresses planned maintenance methodology; and Issue V addresses outage reporting requirements.

Q. What does Issue III specifically ask?

A. Issue III asks: (i) what wind availability reporting methodology should the Commission adopt; and (ii) how should wind availability be appropriately applied to forecasting for a rate determination?

Q. What does Issue IV specifically ask?

A. Issue IV asks: (i) what methodology should the Commission adopt for planned maintenance (e.g., average versus forecast) of thermal, hydro, and wind plants; and (ii) how should this methodology be applied (e.g. high load/low load split, weekend/weekday split)?

Q. What does Issue V specifically ask?

A. Issue V asks what data reporting requirements should the Commission require regarding outages.

Issue III

Q. What wind availability reporting methodology should the Commission adopt and how should wind availability be appropriately applied to forecasting for a rate determination?

A. The Company believes the appropriate method of incorporating availability associated with wind-powered generation resources is to continue the current method of including an availability assumption within the technical study that results in a projected energy production profile for each resource. Similar to other weather-dependent resources (e.g., run of river hydro), the energy production profile is used by the Company in net power cost modeling for the purpose of setting rates. I address availability reporting in response to Issue V below.

Issue IV

Q. What methodology should the Commission adopt for planned maintenance (e.g., average versus forecast) of wind-powered generation resources and how should this methodology be applied (e.g. high load/low load split, weekend/weekday split)?

A. The Company believes the appropriate method of incorporating planned maintenance associated with wind-powered generation resources is to continue the current method of including a planned maintenance assumption within the technical study that results in a projected energy production profile for each resource. Technical studies (further described below) often include a single assumption for wind-powered generation resources intended to reflect availability due to planned and unplanned maintenance as well as a variety of other considerations intended to reflect factors that may ultimately impact actual availability and, therefore, annual energy production.

Wind-Powered Generation Resource Technical Studies

Q. Please generally describe technical studies that result in the forecasted energy production profile for wind-powered generation resources.

A. Attached as Confidential Exhibit PPL/301 is a representative technical study. Generally, such a study projects a maximum energy production and then makes a series of additional adjustments to take into account factors expected to further reduce estimated production. The result is an annual average net energy projection over the life of the resource.

Q. What considerations are typically included in the gross energy forecast?

A. Specific considerations can vary by entity performing the study but, in general, the gross production forecast takes into account: site details (e.g., topography, surface roughness, terrain features, air density, turbine layout, and turbine specifications); meteorological data; wind shear; turbulence intensity; wind direction; and wind-speed frequency distributions. These details are typically used as inputs into multiple models intended to produce a gross energy estimate over the life of the resource. See page 12 of Confidential Exhibit PPL/301.

Q. What considerations are typically included in the adjustment from the gross energy forecast to the net energy forecast?

A. Specific considerations can vary by entity performing the study but, in general, the adjustment from the gross production estimate to the net production estimate takes into account: availability; power curve efficiency; control losses; parasitic losses; electrical losses; icing and blade degradation; high wind hysterisis; wake losses and terrain effects and cold weather shutdown. See page 14 (Exhibit 14; *Gross to Net Assumptions*) of Confidential Exhibit PPL/301.

Q. Can individual adjustments in the gross to net adjustment process be taken in isolation and then reapplied as predictor of net production?

A. No. Because production from wind-powered generation resources is weather dependent, such an application would be inappropriate. For example, it is impossible to predict how hard the wind will be blowing when wind turbines are unavailable due to planned maintenance, unplanned maintenance or for other reasons unrelated to maintenance. Likewise, it is impossible to predict how hard the wind will be blowing when icing conditions may be present or what the correlation is between electrical losses (which are a function of generation output) and wake losses that may or may not be occurring at a given moment due to the direction, turbulence or other factors associated with then-current wind conditions. For this reason, the gross to net loss factors are taken as a whole instead of stand alone independent variables.

Q. What does the resulting energy production profile represent?

A. The resulting energy production profile from a technical study such as that shown in Confidential Exhibit PPL/301 is an annual profile (by month or hour) that represents the normally expected output from the resource on a 50 percent probability basis over the entire life of the resource. Meaning that there is a 50 percent chance the resources will produce more energy in any given year and there is a 50 percent chance that the resource will produce less energy in any given year.

Q. Is the use of a normal outcome consistent with how rates are set for other weather-dependent variables?

A. Yes. Two examples come to mind; hydroelectric resources and retail loads. In each of these instances, the Company utilizes normalized weather for purposes of setting rates in Oregon.

Q. Are there factors that can cause a wind turbine to be unavailable for reasons other than planned or unplanned maintenance?

A. Yes. There is an extremely wide range of reasons why a wind turbine may be off-line for reasons other than maintenance. Wind turbines are highly monitored and contain numerous sensors intended to protect the equipment in the event of conditions that could be harmful to the equipment. For example, such monitoring includes temperature, electrical frequency, wind speed and a large number of other items that are continuously monitored and recorded via the supervisory control and data acquisition (SCADA) system for the resource. In all, there can be 800 or more event codes that the SCADA system tracks for each wind turbine generator; producing a voluminous amount of data.

Issue V

Q. What data reporting requirements should the Commission require regarding wind-powered generation resource outages?

A. The Company believes that the most relevant data to report associated with wind-powered generation resources is the historical annual energy production. The Company currently reports this information via its annual Federal Energy Regulatory Commission (FERC) Form 1. The Company could also make this information available in its annual Results of Operations report filed with the Commission each year.

Q. Why is annual energy production the most appropriate information to report?

A. First, as my testimony describes, technical studies that forecast wind-powered generation resource output take a number of factors into consideration that result in an interdependent outcome based on multiple variables. Many of these variables cannot be directly monitored and, as a result, there is no direct cause and causation link that can readily be established between resource performance and a single variable. This means that one variable (e.g., availability) cannot simply be looked at in isolation and a statistically valid conclusion drawn as to why forecasted energy production varied from actual energy production. In addition, because it is impossible to monitor each and every variable, entities that perform such studies rely on computer models to help forecast energy production.

Second, the Company does not own all of the wind-powered generation resources used in the rate setting process. In fact, of approximately 28 wind-powered generation resources involved in the rate setting process, more than 64 percent are subject to contract. As such, the Company is typically not privy to any asset performance data other than metered output at the point of interconnection with the electric system. Therefore, the Company is unable to calculate other operating performance statistics. Actual energy production is the best and most consistent way for the Commission to understand variances between actual performance and projected performance for wind-powered generation resources (owned and subject to contract) during the rate setting process.

Q. What is the Company's position on wind-powered generation resource data used for setting rates?

A. The Company's position is that the most recent reliable data should be used for setting rates during a test period.

Q. Is the Company's position on this subject in line with a previous Commission finding?

A. Yes. In Order No. 08-548 in the recent Renewable Adjustment Clause proceeding, the Commission stated that "[t]he most recent reliable data should be used to set rates for the test period" (page 21).

Q. In light of this finding, please describe what the most recent reliable data would be for forecasting wind-powered generation resources owned by the Company?

A. For wind-powered generation resources owned by the Company, the most recent reliable data is a technical study estimating annual energy production of the resource; taking into account a multitude of variables that may impact overall energy production. For a resource without the benefit of operating history, the most recent energy production study will necessarily include a combination of historical wind data, model results and other relevant assumptions (e.g., availability due to planned and unplanned maintenance as well as a multitude of other factors). For resources with an operating history, the energy production study will have the benefit of actual production, actual wind data (with installed wind turbines), actual availability information and a voluminous amount of other data to help experts model and validate or re-establish a forecast.

Q. Please describe what the most recent reliable data would be for forecasting wind-powered generation resources owned by third parties?

A. Since the Company is unlikely to have access to the most recent energy production study for third party owned resources, the most recently reliable data would be historical actual metered energy production or periodic estimates provided by the Company's contractual counterparty.

Q. At what point should energy production forecasts be reviewed?

A. Because of the complexity, the Company recommends that energy production forecasts for wind-powered generation resources only be updated via new technical studies and that such new studies only take place after adequate operational data has been collected to detect, on a statistically valid basis, if actual energy production variances are a function of general meteorological factors, site-specific meteorological factors, availability due to event codes, or variances resulting from a variety of other factors that may impact energy production forecasts for use in setting rates. Indeed, there can be 800 or more event codes that impact production capability.

Q. How often should the technical studies be updated?

A. The energy forecast studies for owned wind-powered generation resources should be reviewed and updated, if necessary, approximately every five years or if there is an evident need to perform such an update.

Q. Why approximately every five years?

A. Five years provides an adequate amount of time to collect actual operational data that can be used to perform detailed after-the-fact analysis of why a given resource may have under or over performed previous estimates. Because of the complexity associated with forecasting energy production for wind-powered generation resources, five (5) years of actual data will provide adequate information to distinguish between meteorological impacts, operational impacts or other impacting factors such that re-modeling of the resource can reasonably be expected to have lower variances on a year to year basis going forward.

Q. Are there reasons that could cause the Company to update a technical study more or less often than every five years?

A. Yes. If, after five years, expected production is materially close to projected production then it might be prudent to defer the expense of commissioning a detailed update. Likewise, if there are extenuating circumstances why actual production can reasonably be expected to be materially different than previously forecasted then it might be prudent to re-study the forecasted production. For example, if key equipment associated with the resource is defective and the defect is expected to continue into future rate setting periods then it might be appropriate to seek an updated study.

Q. What is the expense associated with performing updated energy forecast studies in combination with a detailed after-the-fact look back of actual performance compared to projected performance?

A. It is uncertain what the exact expense might be since the Company has yet to commission such work and the actual cost is a function of the specific resource, the amount and quality of data available and the time and complexity of isolating historical information for use in modeling future forecasts. It would not be unreasonable to estimate the cost of such highly detailed work at between $150,000 and $200,000 per study per wind-powered generation resource. At present, the Company currently owns 10 wind-powered generation resources.

Q. Would the Company expect the cost of such studies to be recovered in Oregon rates?

A. Yes. In the event the Commission orders such periodic mandatory updates and/or other studies then the Company would expect that 100 percent of the cost of such updates or studies would be recovered via Oregon rates.

Q. Which wind-powered generation resource has the Company owned for the longest period of time?

A. The Foote Creek I[1] resource has been owned by the Company since approximately 1998.

[1] The Company's shares ownership of the Foote Creek I wind-powered generation resource with the Eugene Water and Electric Board.

Q. Has the Company commissioned updated energy forecasts or detailed after the fact lookback studies for Foote Creek I since it went into operation?

A. No. The Company has included production profiles in its net power cost modeling on the basis of observed after-the-fact actual production. To my knowledge, no party has challenged this practice.

Conclusion

Q. What conclusion do you have for the Commission regarding forced outage rate forecasting when it comes to wind-powered generation resources?

A. I conclude, as it relates to wind-powered generation resources, that forced outage rate forecasting is inherently embedded in the technical energy forecast studies performed for each such resource and, due to the complexity of such studies, it would not be just and reasonable to set rates via a methodology that disaggregates forced outage, availability or any other factor from the technical energy production study of a wind-powered generation resource.

Q. What recommendation do you have for the Commission regarding the frequency of updating technical energy forecast studies for wind-powered generation resources?

A. I recommend that technical energy forecast studies for owned wind-powered generation resources should be reviewed and updated, if necessary, approximately every five years or if there is an evident need to perform such an update. Where the Company has a contract with a wind-powered generation resource, I recommend that actual metered performance be used by the Company for updating its energy forecast estimate or, if estimates are provided by the

Company's contractual counterparty, that such estimates be used if reasonable.

Q. What recommendation do you have for the Commission regarding Commission reporting?

A. I recommend the Commission use the historical annual energy production for each wind-powered generation resource (owned or subject to contract) as reported in the Company's annual FERC Form 1. The Company could also make this information available in its annual Results of Operations report.

Q. Does this complete your testimony?

A. Yes.

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Exhibit PPL/301
Witness: Mark R. Tallman

BEFORE THE PUBLIC UTILITY COMMISSION

OF THE STATE OF OREGON

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Exhibit Accompanying Direct Testimony of Mark R. Tallman

April 2009

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