Confidential per WAC 480-07-160
Exh. MGW-1CT
Docket UE-19____
Witness: Michael G. Wilding

BEFORE THE WASHINGTON

UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PACIFICORP dba PACIFIC POWER & LIGHT COMPANY Respondent.	Docket UE-19____

PACIFICORP

REDACTED DIRECT TESTIMONY OF MICHAEL G. WILDING

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ATTACHED EXHIBITS

Company can realize greater benefits from exporting energy in the EIM than it would during lower priced periods.

Q. How does the Company calculate the GHG benefits?

A. GHG benefits are realized when the GHG revenue is higher than the Company's resulting compliance obligation. The total company GHG benefits for the forecast year 2021 is about $5 million.

Day-Ahead and Real-Time System Balancing Transactions

Q. Please describe the Day-Ahead and Real-Time (DA/RT) adjustment.

A. PacifiCorp incurs system balancing costs that are not reflected in the Company's forward price curve or modeled in GRID. To address this deficiency, the Company proposes the DA/RT adjustment to more accurately model system balancing transaction prices and volumes.

Q. Please explain how the GRID model currently balances load and resources on an hourly basis.

A. The GRID model calculates the least-cost solution to balance the Company's load and resources to fractions of a megawatt for each hour. The model makes purchases in the wholesale market (labeled as "system balancing purchases" in the NPC report) in the hours for which the Company does not have enough owned or contracted resources to meet its load. The model also makes wholesale market sales (labeled as "system balancing sales" in the NPC report) when it has excess resources for a given hour. These system balancing transactions are calculated for each hour independently and are for the precise volume required by the model. Wholesale market prices for the system balancing sales are based on an hourly forward price curve that is

developed from monthly HLH and LLH prices with hourly scalars applied. These scalars are identical within a given month for each weekday of that month. The prices are input into the model and do not change based on the volume of the system balancing transactions.

Q. How do actual operations differ from the GRID model logic?

A. In actual operations, the Company continually balances its market position—first with monthly products, then with daily products, and finally with hourly products. The monthly and daily position is calculated as the average for the respective time horizon during HLH and LLH periods; for example, the average HLH position during the month of January or the average LLH position on a given day in February. The monthly and daily products used to balance the Company's position in the wholesale market are available in flat 25 MW blocks. The Company's load and resource balance, however, varies continuously each hour in quantities that may vary widely from a flat 25 MW block. In real-time operations, the Company balances its hourly position in the hourly real-time market. At that point, the Company must transact to maintain a balanced system and, as a result, becomes a price-taker subject to whatever price is available at the time.

Q. How do the system balancing volumes in GRID compare to the Company's actual volumes?

A. The volume of system balancing transactions generated by GRID is smaller than the volume of similar transactions in actual results. Because GRID balances the Company's load and resources to fractions of a MW for each hour in a single step, it avoids the additional purchase and sale transactions that occur in actual operations as

the Company progresses through balancing its system on a monthly, daily, and real-time system basis.

For instance, when the Company buys a monthly product that aligns with the Company's average open position for the month, one can expect that roughly half of the days will still have a remaining position to be covered by additional daily purchases. On the other days, the Company will have to make daily sales to unwind the excess volume. The same is true for daily transactions—in some hours the volume acquired will be too low, while in others it will be too high, and additional purchases and sales will be required to cover the Company's actual position.

In addition, buying or selling standard block products for monthly and daily average requirements will not result in a perfect balance of load and resources. This difference then must be closed out in the real-time market where the Company is a price-taker.

Q. Please describe the price component of the DA/RT adjustment.

A. To better reflect the market prices available to the Company when it transacts in the real-time market, PacifiCorp includes in GRID separate prices for forecast system balancing sales and purchases. These prices account for the historical price differences between the Company's purchases and sales compared to the monthly average market prices.

Q. Why is the DA/RT adjustment needed to differentiate the market prices for purchases and sales?

A. The GRID model used an hourly price curve developed from monthly HLH and LLH forward market prices. Hourly prices were simply the product of applying a scalar, or

shape, to the monthly average prices. These scalars were identical within a given month for each weekday of that month. In addition, the prices were input into the model and did not change regardless of the volume of the system balancing transactions or other system conditions in the model. In reality, however, prices vary within each month and the Company has historically bought more during higher-than-average price periods and sold more during lower-than-average price periods. As a result, the average cost of the Company's daily and hourly short-term firm purchases has been consistently higher than the average actual monthly market price, while the average revenues from its daily and hourly short-term firm sales has been consistently lower than the average actual monthly market price.

Q. Please describe the volume component of the DA/RT adjustment.

A. The Company reflects additional volumes to account for the use of monthly, daily, and hourly products. In actual operations, the Company continually balances its market position—first with monthly products, then with daily products, and finally with hourly products. The products used to balance the Company's forward position in the wholesale market are available in flat 25 MW blocks. The Company's load and resource balance, however, varies continuously each hour in quantities that may vary widely from a flat 25 MW block. Thus, in real world operations, the Company must continuously purchase or sell additional volumes to keep the system in balance.

In contrast, GRID has perfect foresight and can model wholesale market transactions at whatever volume is necessary to balance the system. Because of GRID's perfect foresight, it can balance the system with far fewer transactions. The

DA/RT adjustment adds additional volumes to NPC to more accurately model the transactions necessary to balance the Company's system.

Q. Where else does PacifiCorp use the DA/RT adjustment in forecast NPC?

A. Since 2015, PacifiCorp has used the DA/RT adjustment in all filings for all jurisdictions that have included forecast NPC.

Thermal Plant Forced Outages

Q. Please summarize the Company's proposal to more accurately model thermal plant forced outages.

A. The Company previously modeled forced outages at thermal units using a percentage de-rate or "haircut" to nameplate capacity in all hours. In this case, the Company modeled forced outages and unit de-rates as discrete events, rather than applying a uniform de-rate to the plant operating characteristics across all hours. In addition, because outages are no longer modeled as de-rates, the Company removed the corresponding adjustments to heat rates and minimum operating levels.

Q. Please explain the basis for the Company's previous modeling of forced outages on thermal units in GRID.

A. Under the Company's previous methodology, forced outages and unit de-rates were modeled in GRID as a percentage reduction to the maximum capacity of each unit. The percentage reduction was calculated using a four-year average of actual outage events. In GRID, this approach constrained unit output between minimum operating level and a de-rated maximum, with a slice of each unit being unavailable for dispatch in every hour. Because thermal units typically operate most efficiently near full capacity, a low cost operating segment was thus unavailable to GRID.

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FORECAST COAL COSTS

Q. Has forecast coal expense in the test period decreased from the amount in the 2014 Rate Case?

A. Yes. As shown in Figure 7 above, forecast coal fuel expense decreased by $5.4 million on a Washington-allocated basis, from $57.2 million in the 2014 Rate Case to $51.8 million in the test period. Reduced volumes account for an $11.1 million decrease and are partially offset by a $5.7 million coal price increase.

Q. Please explain why coal consumption decreased in the test period?

A. Increased generation from non-emitting resources and natural gas resources has significantly reduced coal generation in the test period compared to the 2014 Rate Case.

Q. Please quantify the reduced coal consumption amount in the test period?

A. On a Washington-allocated basis, the test period forecast [redacted] million million British Thermal Units (MMBtus) of coal will be consumed, which is [redacted] million less MMBtus than the 2014 Rate Case. This is a [redacted] percent decrease.

Q. Is the impact of the reduced coal consumption similar at Jim Bridger and Colstrip?

A. Yes. On a Washington-allocated basis, Jim Bridger is projected to consume [redacted] million MMBtus in the test period, which is [redacted] million MMBtus or [redacted] percent less than in the 2014 Rate Case. On a Washington-allocated basis, Colstrip is projected to consume [redacted] million MMBtus in the test period, which is [redacted] million MMBtus or [redacted] percent less than forecast in the 2014 Rate Case.

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Jim Bridger Coal Costs

Q. Please explain the coal supply arrangements for Jim Bridger.

A. Similar to the 2014 Rate Case, Jim Bridger is expected to be supplied by a combination of coal supplies from Bridger Coal Company (BCC) and the Black Butte mine in the test period.

Q. Can you please quantify the cost increase at Jim Bridger?

A. Yes. As shown in Confidential Figure 8, Jim Bridger costs increased [redacted] million on a Washington-allocated basis.

Confidential Figure 8

Jim Bridger Plant Coal Deliveries - PacifiCorp Portion

Supplier	2021 Test Period Tons	2021 Test Period Dollars	2021 Test Period $ / Ton	2014 Rate Case Tons	2014 Rate Case Dollars	2014 Rate Case $ / Ton	Variance Tons	Variance Dollars	Variance $ / Ton	WA Allocated Price Variance
Bridger Coal Deliveries	[redacted]									
Black Butte Deliveries	[redacted]									
Total Jim Bridger Plant	[redacted]									

Q. Of the $[redacted] million coal cost increase at Jim Bridger, how much is attributable to BCC?

A. BCC coal costs increased from [redacted] per ton to [redacted] per ton, or by [redacted] per ton, which resulted in a Washington-allocated price variance of [redacted] million.

Q. Please identify the primary drivers impacting test period costs at BCC.

A. Test period cost increases are primarily due to: (1) decreased coal deliveries; (2) escalation; and (3) the ending of coal production earlier than assumed in the 2014 Rate Case. Off-setting test period cost decreases are primarily due to: (1) an increase in the coal's heat content; (2) an increase in final reclamation activities (reduces operating costs charged to coal); and (3) other miscellaneous items.

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Q. Please identify reduced coal deliveries by source and discuss the impact on delivered coal costs from BCC.

A. As noted in Confidential Figure 9 below, BCC is projected to deliver on a total PacifiCorp basis [redacted] million or [redacted] percent fewer tons in the test period.

Confidential Figure 9

Jim Bridger Plant Coal Deliveries - PacifiCorp Portion

[redacted]

Reduced coal deliveries increase costs expressed on a per ton basis because fixed costs are recovered over smaller volumes. On a Washington-allocated basis, BCC delivered coal costs increased by [redacted] million due to delivering fewer tons in the test period.

Q. Can you provide a directional estimate of the inflationary impact on BCC coal costs in the test period relative to the 2014 Rate Case?

A. Yes. The 2014 Rate Case test period was April 2015 through March 2016 and the current test period is calendar year 2021. The mid-point between the two periods is 5.75 years (October 1, 2015, and July 1, 2021). The compound annual growth rate for the Gross Domestic Product-Implicit Price Deflator (GDP-IPD) for October 1, 2015, through the mid-point in the test period (July 1, 2021) is 2.00 percent. The calculated inflation rate of 12.04 percent is determined by multiplying the annualized growth rate in the GDP-IPD by the appropriate escalation period (5.75 years). On a

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Washington-allocated basis, cost increases driven by inflation are estimated at [redacted] million in the test period.

Q. Can you briefly describe the impact of shuttering coal production activities in the test period earlier than was assumed in the 2014 Rate Case?

A. Yes. The 2014 Rate Case assumed the BCC surface mine would continue to produce coal through 2037 and the underground mine would produce coal through 2023. The test period projects surface coal deliveries cease in 2028 and underground mine production terminates in 2021. Early closure of mining operations increased final reclamation contribution amounts and increased depreciation expense expressed on a cost per ton basis. On a Washington-allocated basis, BCC final reclamation contributions increased $[redacted] million and depreciation expense increased $[redacted] million.

Q. BCC cost increases totaling $[redacted] million dollars have been identified above. Please identify cost reductions that result in a total BCC coal cost increase of $[redacted] million.

A. The heat content of BCC coal delivered in the test period is [redacted] Btus per pound which is [redacted] Btus per pound higher than the [redacted] Btus per pound amount assumed in the 2014 Rate Case. This increase in heat content results in a BCC coal cost reduction of $[redacted] million. A BCC coal cost decrease of $[redacted] million is associated with increased final reclamation activities. Final reclamation expenditures are removed from costs charged to coal production. The remaining net cost decrease of $[redacted] million is driven by reductions for materials and supplies and coal inventory.

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Q. Did the Black Butte coal price increase in the test period compared to the 2014 Rate Case?

A. Yes. The Black Butte coal price in the test period is based on the existing contract amount of $[redacted] per ton for 2021 which is $[redacted] per ton higher than the $[redacted] per ton, free on board (FOB) mine price assumed in the 2014 Rate Case. Including Union Pacific rail transportation costs from the Black Butte mine to Jim Bridger and application of anti-freeze agent applied to railcars during winter months, the delivered cost of Black Butte coal increased from $[redacted] per ton in the 2014 Rate Case to $[redacted] per ton in the test period, or by $[redacted] per ton. The increased price is primarily due to inflation over the 5.75 year difference. The annualized escalation rate of the Black Butte coal price between the test period and the 2014 Rate Case is slightly lower than the calculated GDP-IPD inflation for the same period.

Colstrip Coal Costs

Q. Did coal prices increase at Colstrip in the test period compared to the 2014 Rate Case?

A. Yes. Coal costs on a Washington-allocated basis increased by $[redacted] million in the test period compared to the 2014 Rate Case.

Q. Please explain the coal supply arrangements for Colstrip.

A. Colstrip is supplied by coal delivered from the Rosebud Mine owned by Westmoreland Rosebud Mining, LLC.

Q. Please describe the price increase associated with the Colstrip coal supply.

A. Coal costs increased from [redacted] per ton in the 2014 Rate Case to [redacted] per ton in the test period, or by [redacted] per ton. The current coal supply agreement expires