EXH. PKW-3C DOCKET UE-18__ PCA 16 COMPLIANCE WITNESS: PAUL K. WETHERBEE

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Petition of

PUGET SOUND ENERGY

For Approval of its April 2018 Power Cost Adjustment Mechanism Report DOCKET UE-18___

SECOND EXHIBIT (CONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF

PAUL K. WETHERBEE

ON BEHALF OF PUGET SOUND ENERGY

REDACTED VERSION

APRIL 30, 2018

PUGET SOUND ENERGY

SECOND EXHIBIT (CONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF PAUL K. WETHERBEE

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PUGET SOUND ENERGY

ILLUSTRATION OF PSE'S PORTFOLIO AND RISK MANAGEMENT ACTIVITIES FOR PCA PERIOD 16 POWER SUPPLY FOR THE SINGLE MONTH JULY 2017

I. PUGET SOUND ENERGY'S HEDGING PLANS

The purpose of this exhibit is to illustrate the manner in which Puget Sound Energy ("PSE") manages its electric portfolio, including risk management activities, by describing in more detail the hedge programs utilized to managed power supply and costs for a single month during Power Cost Adjustment Mechanism ("PCA") Period 16: July 2017.

In accordance with PSE's Energy Risk Policy, the Energy Management Committee ("EMC") is responsible for providing policy-level and strategic direction on energy supply portfolio risk issues and significant new long-term resources and contracts. Energy Supply Merchant department staff ("ESM") manage PSE's short-term energy supply hedging and portfolio risk activities with the Actively Managed Hedge and the Programmatically Managed Hedge. The Actively Managed Hedge program consists of the next full calendar months and is managed in accordance with the EMC approved Energy Supply Transaction and Hedging Procedures Manual ("Procedures Manual").

As defined in the Procedures Manual under Schedule F - Spot Market Exposure for Gas and Power Portfolios, the Authorized Traders have an exposure authority limit up to \$ monthly and \$ for a rolling period. This rolling period is referred to as the Actively Managed Hedge. Spot market exposure above the Authorized Traders limit requires notification to the EMC. At the end of each business day, the Energy Risk Control ("ERC") department calculates exposure individually for on-

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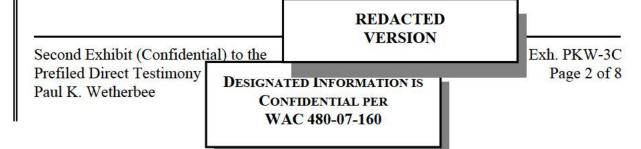
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peak, off-peak, and gas for power positions with the authority limit calculated on the total net exposure of all three positions. Spot market exposure is measured by valuing the net open position, in megawatt hours, off the forward market price. It represents the net dollar amount that PSE has not hedged during a certain timeframe, given forecasted volumes and market prices. See Exh. PKW-7C for the Schedule F excerpt from the Procedures Manual.

The Programmatically Managed Hedge program is an EMC approved strategy that covers the beyond the Actively Managed Hedge period. This strategy is designed to manage the power portfolio total net exposure so that as a month rolls into the Actively Managed Hedge period the exposure for that month will be within the monthly limit under Schedule F. For the Programmatically Managed Hedge strategy, the maximum monthly exposure reduction is calculated by dividing the total net exposure by the remaining number of months prior to the time when the position falls into the Actively Managed Hedge. The minimum monthly exposure reduction is calculated by dividing the total net exposure (plus or minus the EMC monthly limit authority) by the remaining number of months prior to the time when the position falls into the Actively Managed Hedge. If such a month's position already falls within the Schedule F monthly exposure limit authority, there is no monthly hedge requirement.

ESM uses various reports, analytics and data tools to manage positions, measure specific portfolio risks, and compare hedge choices. Examples include stochastic price simulations, portfolio cost simulation and scenario analysis. The stochastic model allows varying key inputs, such as volatility, to create price distributions, which can aid in making hedge decisions.



The remainder of this exhibit will illustrate the hedging programs used by ESM for PCA Period 16. Sections II through IV provide a summary of and discuss some of the analyses relied upon by ESM to make hedging decisions for July 2017. Section V describes Exh. PKW-4C through Exh. PKW-9C, which collectively provide additional detail supporting this narrative.

II. PROGRAMMATICALLY MANAGED HEDGE PERIOD THROUGH

was first included in the Programmatically Managed Hedge period. At the time, the on- and off-peak power exposure was , respectively, and the natural gas exposure was and for With remaining until July 2017 would a total net exposure of roll into the Actively Managed Hedge, the maximum monthly exposure reduction was). Given the then market implied flat heat rate of 9.4 MMBtu/MWh, commodity prices and the value of PSE's gas-fired generation resources, the net exposure for July 2017 was below the Procedures Manual Schedule F authority limit of See Exh. PKW-4C for the July 2017 exposure over the entire hedging period.

Although there was not a minimum requirement to remove exposure for July 2017 over the course of the Programmatically Managed Hedge period there were minimum requirements for August and/or September. During the first half of 2015, ESM power for the entire third quarter (July, August and September) of 2017 to meet minimum hedge requirements for August and September, and then later rebalanced the portfolio. By

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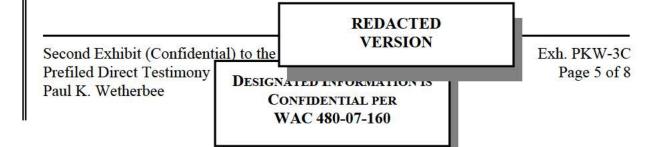
III. ACTIVELY MANAGED HEDGE PERIOD

In July 2017 rolled into the Actively Managed Hedge period. This hedge program allows ESM to more actively manage the July 2017 position for a full prior to delivery. At the beginning of the July 2017 net exposure was with a million on-peak power position, a million off-peak power position and a million natural gas position. See Exh. PKW-4C for the July 2017 exposures over the hedging period. At that time, market implied flat heat rates for July 2017 were averaging around 10.0 MMBtu/MWh, a level where PSE's gas-fired generating resources could be economically dispatched. See Exh. PKW-8C for the daily forward heat rate trends for July 2017.

From through early , ESM a combination of natural gas and power to reduce spot market exposure. The of natural gas, combined with natural gas generating resources creates a flexible power hedge with the option to re-balance with in the future.

In through early , ESM began to analyze hydro conditions for the 2017 water year. Given the current heat rate levels and a bias toward higher regional hydro, ESM began to heat rate by natural gas and power to lock in natural gas generation value for the portfolio.

Starting in through early the regional hydro runoff forecasts for water year 2017 increased, which caused July 2017 market heat rates to decrease. See pages one and two of Exh. PKW-6 for Northwest River Forecast Center



Hydro runoff measured at Grand Coulee was 11% lower than normal for July 2017. See page three of Exh. PKW-6 for Grand Coulee runoff volumes. Daily market flat heat rates for July 2017 ranged from 7.5 to 21.0 MMBtu/MWh, averaging 11.5 MMBtu/MWh for the month. On-peak Mid-C power prices averaged \$29.91/MWh, off-peak Mid-C power prices averaged \$21.24/MWh and Sumas gas price averaged \$2.29/MMBtu. See Exh. PKW-9C for July 2017 forward market and daily settlement prices.

V. SUPPORTING EXHIBITS

The monthly exposure for July 2017 is included in Exh. PKW-4C. July 2017 hedges were executed in accordance with both the Programmatically Managed Hedge and Actively Managed Hedge programs, and the hedge details are shown for both power and gas in Exh. PKW-5C.

Graphs of the NWRFC forecasts for the January through July 2017 period and the April through September 2017 period are provided in Exh. PKW-6, as is a graph of the actual monthly runoff volumes at Grand Coulee for water years 2015 through 2017. The 30 year average (1981-2010), referred to as "normal," for the January through July period at Grand Coulee is 59,599 thousand acre-feet ("KAF"). The actual January through July 2017 runoff was nearly 126 percent of normal at Grand Coulee, or 74,905 KAF.

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A copy of Schedule F from the Procedures Manual, "Spot Market Exposure for Gas and Power Portfolios," which provides the monthly exposure limits, is provided in Exh. PKW-7C.

Daily heat rate trends for July 2017 can be found in Exh. PKW-8C, as well as the dispatch heat rate of PSE's gas fired turbines. Implied market heat rates fluctuate daily depending on the power and gas prices, and are part of the dispatch logic used in the risk model to determine which gas fired turbines may dispatch economically.

Commodity prices for July 2017 are provided in Exh. PKW-9C. The first chart illustrates on-peak power, off-peak power, and gas forward market prices as they evolved over the hedging period. The second chart displays the daily settlement prices for Mid-C power and Sumas gas for the month of July 2017.

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