EXHIBIT NO. ___(DEM-3C)
DOCKET NO. UE-15____
PCA 13 COMPLIANCE
WITNESS: DAVID E. MILLS

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Petition of **PUGET SOUND ENERGY, INC.** **For Approval of its March 2015 Power Cost Adjustment Mechanism Report**	**Docket No. UE-15____**

SECOND EXHIBIT (CONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF DAVID E. MILLS ON BEHALF OF PUGET SOUND ENERGY, INC.

REDACTED VERSION

MARCH 31, 2015

PUGET SOUND ENERGY, INC.

SECOND EXHIBIT (CONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF DAVID E. MILLS

REDACTED

REDACTED

PUGET SOUND ENERGY, INC.

ILLUSTRATION OF PSE'S PORTFOLIO AND RISK MANAGEMENT ACTIVITIES FOR PCA PERIOD 13 POWER SUPPLY FOR THE SINGLE MONTH MARCH 2014

I. PUGET SOUND ENERGY'S HEDGING PLAN

The purpose of this exhibit is to illustrate the manner in which Puget Sound Energy, Inc. ("PSE") manages its electric portfolio, including risk management activities, by describing how PSE managed power supply and costs for a single month during Power Cost Adjustment Mechanism ("PCA") Period 13: March 2014.

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. Power and Gas Supply Operations Staff ("Staff") follow the EMC approved Programmatic Hedge strategy to guide them in the specific time periods and quantities of energy to hedge. PSE manages its short-term energy supply hedging and portfolio risk activities in accordance with the EMC-approved Energy Supply Transaction and Hedging Procedures Manual ("Procedures Manual").

On July 22, 2004, the EMC approved the original programmatic hedging strategy, with a Staff transactional purview of [redacted]. The programmatic hedge strategy authorizes Staff to use a dollar cost averaging informed by Margin at Risk ("MaR") analysis, with defined minimum and maximum monthly exposure limits. This hedging plan increases Staff's ability to react to position changes such as those due to stream or hydro flow variation, forced thermal plant outages and changing market conditions.

The term of the EMC approved strategy, known as the "Programmatically Managed Hedge" period, consisted of the last [redacted] of the [redacted] purview - this was also known as the "Rolling [redacted] Hedge". The first [redacted] (current month plus the following [redacted]) of the [redacted] purview were actively managed ("Actively Managed Hedge") in accordance with the Procedures Manual.

On January 7, 2006, the "Rolling [redacted] Hedge" was amended to be a "Rolling [redacted] Hedge" and the Actively Managed Hedge was extended to include the current month plus the next [redacted]. In October 2007, consistent with PSE's benchmarking of hedging best practices and market research efforts tailored to measure the value of energy commodity hedging to customers, PSE extended its hedging tenor from [redacted] to [redacted]. At that time, the first [redacted] of this period became the Actively Managed Hedge period and the remaining [redacted] through [redacted]) became the Programmatically Managed Hedge period in accordance with the EMC approved strategy. The Programmatically Managed Hedge period is currently referred to as the "Rolling [redacted]" hedge but it can extend through [redacted] to include hedging with power only (not gas) for a full calendar quarter. Since power is not liquidly traded on a monthly basis beyond the first [redacted] months, the Programmatically Managed Hedge ends with a full calendar quarter. For example, when the month of January rolls into the strategy as [redacted], the months of February and March also roll into the strategy, as [redacted], to have a complete quarter for purposes of hedging power. If Staff elects to hedge [redacted] by purchasing power, then power is purchased for the entire quarter. However, if Staff elects to hedge by purchasing gas, then gas is purchased for that month only. The Programmatically Managed Hedge is designed to reduce PSE's net power portfolio

exposure starting [redacted] in advance of delivery, subject to minimum and maximum exposure reduction, based upon a fundamental view, and is intended to remove commodity price volatility.

All of the transactions for the "sample PCA month" (March 2014) were executed after the extension of the hedging strategy and most were transacted more than [redacted] prior to delivery. Transactions within [redacted] of delivery fall within the Actively Managed Hedge period and for March 2014 were primarily shorter-term balancing transactions to respond to changes in market heat rates, customer demand, current hydro conditions, unit assumptions and other variables.

The Programmatically Managed Hedge is designed to reduce the power portfolio's total net exposure for each month, so that the total net exposure will fall below the EMC exposure limits set forth in the Procedures Manual. The "maximum" monthly hedge for the Programmatic Managed Hedge is calculated by dividing the total net exposure by the remaining months prior to the time when the position falls into the Actively Managed Hedge term. The "minimum" monthly hedge is calculated by dividing the total net exposure (plus or minus the Director's limit authority) by the remaining months prior to the time when the position falls into the Actively Managed Hedge. However, since the Rolling [redacted] hedge always ends on a quarter to allow for purchasing the more liquid quarterly power products, the minimum limit is zero for [redacted] so that if Staff elects to hedge by purchasing gas, there is no requirement to remove exposure for [redacted]. The "mid-point" monthly hedge is the average of the "maximum" and the "minimum" monthly hedge amounts. If such a month's position already falls within the Director's exposure limit authority, there is no monthly hedge requirement. As defined in Schedule F

of the Procedures Manual, "Spot Market Exposure for Gas and Power Portfolios", the Authorized Traders have exposure authority up to $[redacted] monthly or $[redacted] for the rolling [redacted] period. Spot market exposure above the Authorized Traders level requires notification to the EMC. See Exhibit No. ___(DEM-9C) for the Schedule F excerpt from the Procedures Manual.

During the Actively Managed Hedge period, Staff manages the monthly net exposure in accordance with the Procedures Manual. The exposure is calculated individually for on-peak, off-peak, and gas for power positions. The authority limit is calculated on the net spot exposure of all three positions. Spot market exposure is measured by multiplying the open position by the forward market price.

Staff uses various reports, analytics and data tools to manage positions, measure specific portfolio risks, and compare hedge choices. One example of the decision support tools is Margin at Risk. Margin at Risk ("MaR") is a tool that measures risk reduction as a result of incremental hedging. MaR analysis shows how much risk reduction is gained by month and by strategy – providing an additional tool to determine which commodity is the best choice and for which month. The MaR calculation shows the amount of portfolio risk removed for each hedging dollar spent when 25 MW of on-peak or off-peak power or 5,000-MMBtu/day of gas is transacted as these represent typical volumes for market transactions. The MaR tool was used often over the course of the Programmatically Managed Hedge tenor for determining which commodity, power or gas for power, to purchase for March 2014 delivery. With a focus on continuous improvement, other tools have been added over time to provide enhanced hedging decision support. Examples include stochastic price simulations, portfolio cost simulation and scenario analysis,

portfolio sensitivity analysis and option pricing models. The stochastic model allows varying key inputs, such as volatility, to create prices distributions which can aid in making hedge decisions.

The remainder of this report will illustrate the systems and tools used by Staff and their application for PCA Period 13 by describing actual hedging strategy decisions and the execution thereof by PSE. Please reference section II through IV which provide a summary of [redacted] – March 2014 and review the analysis and fundamental views Staff relied upon to make hedging decisions for March 2014. Section V provides a description of the exhibits, Exhibit No. ___(DEM-4C) through Exhibit No. ___(DEM-12C), which provide additional detail supporting this narrative.

II. PROGRAMMATICALLY MANAGED HEDGE PERIOD

A. [redacted] THROUGH [redacted]

In [redacted], the entire [redacted] rolled into Staff's Programmatically Managed Hedge purview. Therefore, March 2014 was within the Programmatically Managed Hedge strategy. At the beginning of [redacted], the position report indicated the March 2014 net exposure was [redacted] with a [redacted] MW on-peak power [redacted] position, a [redacted] MW off-peak power short position and a [redacted] MMBtu/day natural gas [redacted] position. At the time, the portfolio position indicated that the on- and off-peak power positions, valued at the current market price, resulted in an on- and off-peak power exposure of [redacted] and ([redacted], respectively. This power exposure, combined with the [redacted] natural gas exposure totaled a net exposure of

[redacted]. See Exhibit No. ___(DEM-4C) for the March 2014 exposures over the entire hedging period.

The "maximum" monthly reduction in exposure yet to be accomplished by Staff is the net exposure noted above divided by the remaining months prior to the time when the position falls into the Actively Managed Hedge. In [redacted], with [redacted] remaining before March 2014 fell into Staff's Actively Managed Hedge, the maximum monthly reduction was $[redacted]). Since March 2014 is month [redacted], and Staff is not obligated to remove exposure for months [redacted], the "minimum" reduction is zero (as explained above). The "mid-point" reduction, or the average of the "maximum" and "minimum" amounts, is [redacted].

In early [redacted], as part of the Programmatically Managed Hedge strategy, Staff reviewed market fundamentals and came up with a hedging strategy for the [redacted] through March 2014 time frame. Staff elected to hedge to maximum for the Programmatically Managed Hedge. As a result, Staff reduced the total net exposure for March 2014 by [redacted]. Often the tenure of an entered power hedge transaction spans a full quarter or full calendar year due to the fact that quarterly and calendar strips are much more liquid than single month markets and the pricing and volume reflect the availability at that time. Most of the power hedge transactions for March 2014 were either quarterly or calendar year strips. See Exhibit No. ___(DEM-10C) for the fundamentals and Exhibit No. __ (DEM-12C) for market prices that affected March 2014.

During the months of [redacted], Staff managed the March 2014 spot market exposure similar to [redacted] –to reduce the monthly exposures at a

[redacted] level pursuant to the Programmatically Managed Hedge strategy – with an eye towards the power and natural gas market fundamentals.

In [redacted], continuing to reduce exposure at a [redacted] level, Staff again purchased a total of [redacted], to reduce March 2014 exposure. PSE's net exposure [redacted] as a result of lower heat rates and higher power prices. Given lower market implied heat rates, the probabilistic portfolio position reflected less gas-fired generation that was economical to dispatch which meant the power position got shorter and at the same time power prices were higher, resulting in more exposure.

At the beginning of [redacted], looking at delivery month March 2014, PSE's MaR analysis indicated that the most effective exposure reduction would be to [redacted] on-peak or off-peak power. See Exhibit No. ___(DEM-5C) for the March 2014 MaR over the hedging term. For example, if 5,000 MMBtu/day gas was purchased for March 2014, it would reduce risk by nearly [redacted] for every $100 spent or [redacted] for every dollar spent, compared to [redacted] with the purchase of [redacted] MW of on-peak or off-peak power. The MaR analysis indicated greater risk reduction would be gained from the [redacted]. Staff considers various factors in addition to the MaR when determining what commodities to purchase and when. During this period of time, both the gas position and the on- and off-peak power positions were [redacted]. Volumetrically, the on-peak and off-peak power positions were significantly [redacted] than the gas position. For example, beginning [redacted], the gas exposure was [redacted] MMBtu/day [redacted]) compared to the ([redacted] on-peak and ([redacted]) off-peak power [redacted] positions. In [redacted], Staff planned to [redacted] for March 2014. During this

month, Staff purchased [redacted] MW of on-peak power and [redacted] MW of off-peak power for the entire first quarter, to reduce March 2014 exposure. These purchases reduced total net exposure by [redacted].

Staff continued to hedge March 2014 during the months of [redacted] MW on-peak power, [redacted] MW off-peak power and [redacted] MMBtu/day of gas for power which reduced March 2014's net exposure by [redacted].

At the beginning of [redacted] Staff determined to switch from hedging at maximum exposure reduction levels to minimum exposure reduction levels for all delivery terms in 2014 which, at the time, made up the [redacted] of the Programmatically Managed Hedge period. Market liquidity was very thin beyond the [redacted] and it appeared to be related to summertime thin market. Staff continued to hedge at [redacted] exposure reduction levels for 2014 in [redacted]. During the three months ([redacted]) at the [redacted] hedging level staffed removed a total of [redacted] exposure by [redacted] MW of on-peak and off-peak power and [redacted] MMBtu/day of gas for power.

In [redacted], Staff determined to go back to hedging the 2014 delivery term at [redacted] levels given the shift in market liquidity and remained at that level for March 2014 hedging through [redacted], the remainder of the Programmatically Managed Hedge period. During the months of [redacted], Staff continued to ratably decrease March 2014's net exposure and [redacted] an additional [redacted] gas for power, [redacted] MW of on-peak power and [redacted] MW of off-peak power, bringing the net exposure to [redacted].

In [redacted] a couple of changes were made to the model that impacted demand and generation forecasts. First, PSE updated its customer load forecast and as a result, the March 2014 demand forecast [redacted] MW in the on-peak and [redacted] MW in the off-peak hours. Next, the Colstrip minimum uptime and minimum capacities were updated in the position model resulting in less coal generation annually during the months of March through July. Therefore, the on-peak and off-peak power positions got [redacted]. During [redacted], Staff [redacted] MW of on-peak power and [redacted] MMBtu/day of gas for power for March 2014 delivery. These hedges, combined with the updates in generation and demand forecasts, reduced the net exposure for March 2014 to [redacted] million.

Staff continued to hedge at [redacted] hedge levels for March 2014 during the months of [redacted] by [redacted] a total of [redacted] MW of on-peak power and [redacted] MMBtu/day of gas for power, resulting in a reduction of net exposure to [redacted] million.

In [redacted], Staff added the Ferndale gas-fired generation resource acquisition to its portfolio and modeled position with a capacity of 273 MW and a dispatch heat rate of [redacted] Btu/kWh. Market heat rates for March 2014 at that time were just below the dispatch heat rate of the Ferndale plant so the modeled probabilistic on-peak and off-peak power positions increased only [redacted] aMW and [redacted] aMW, respectively. During the month of [redacted], Staff [redacted] MW of on-peak power, by [redacted] the entire [redacted], and by [redacted] MMBtu/day of gas for power for March 2014 delivery, in an effort to remove exposure.

During the months of [redacted], the final [redacted] months of the Programmatically Managed Hedge period, staff reduced the net exposure to

[redacted] million by [redacted] MW of on-peak and [redacted] MW of off-peak power for the entire [redacted] and by [redacted] MMBtu/day of gas for power.

III. ACTIVELY MANAGED HEDGING PERIOD

In [redacted], March 2014 rolled into Staff's Actively Managed Hedge. This allowed Staff to more actively manage the March 2014 position for a full [redacted] prior to delivery. At the beginning of [redacted], the position report indicated the March 2014 net exposure was [redacted] with a ([redacted] or [redacted] MW on-peak power [redacted] position, a [redacted] or [redacted] MW off-peak power [redacted] position and a [redacted] or [redacted] MMBtu/day natural gas [redacted] position. See Exhibit No. ___(DEM-4C) for the March 2014 exposures over the hedging period. At that time, market implied flat heat rates for March 2014 were averaging around [redacted], a level where two of PSE's gas-fired generators were right on the cusp of being economically dispatched. See Exhibit No.__ (DEM-11C) for the daily heat rate trends for March 2014. The total net exposure was [redacted]. Given the [redacted] for the power book, Staff chose, at that time, to [redacted].

During the months of [redacted] implied market heat rates fluctuated from [redacted] Btu/kWh, a level that would have two gas-fired generation units economically dispatched. As a result, the probabilistic on- and off-peak power positions switched from a [redacted] to a [redacted] position while the gas for power position got [redacted]. Staff at that time decided to [redacted]. In

[redacted], PSE adjusted its customer load forecast and as a result demand [redacted] by [redacted] MW on-peak and by [redacted] MW off-peak for March 2014.

In February 2014, with March 2014 as the prompt month, in addition to the probabilistic modeled position, PSE also considered a [redacted] position for March 2014 set-up. Given the dry winter we had been experiencing, runoff at Grand Coulee had been averaging below normal water year to date (October 2013 through January 2014). In early February 2014, the January-July forecast for outflows at Grand Coulee remained below normal at 82% of normal. At the same time, the weather forecasts for the Pacific Northwest ("PNW") were calling for near normal temperatures for March 2014 with equal chances for normal, above normal or below normal precipitation, which provided some support to both the March 2014 power and gas prices if the dry weather was to continue. At the time, on-peak market implied heat rates for March 2014 were up around the 9,000 level, well above historical daily settled heat rates for the month of March. Staff decided to rebalance the commodity mix of hedges and as a result [redacted] on-peak heat rate by [redacted] MMBtu/day of natural gas. Toward the end of February 2014, heat rates for March 2014 decreased and staff [redacted] of natural gas. At the end of February 2014, due to an increase in market prices, the net exposure for March 2014 was ([redacted], within the Actively Managed hedging limits defined by the Procedures Manual.

IV. MARCH 2014 – WITHIN MONTH OVERVIEW

At the end of February 2014, the net exposure for March 2014 was [redacted], which represented a [redacted], respectively. As PSE entered March 2014, market observers were taking into consideration the weather forecasts for the remainder of the spring and summer months and the impact on hydro generation given the massive turnaround in snowpack in February. The January through July runoff forecast for Grand Coulee had increased by 12% to 94% of normal. Given the increase in the water supply forecast for Grand Coulee to a "normal" level, a lower end of month target elevation for Grand Coulee was established which resulted in a greater amount of hydro generation available in the region. March 2014 began with flat market heat rates at [redacted] Btu/kWh and ended at the [redacted] Btu/kWh level. The average daily flat heat rate for the month was [redacted] Btu/kWh, with on-peak power prices averaging [redacted]/MWh, off-peak power prices averaging [redacted]/MWh and the gas price averaging [redacted]/MMBtu. As heat rates in the day-ahead market [redacted] MW of on-peak power for the balance of the month to cover the [redacted] position created by [redacted]. Staff did not [redacted] due to the need to increase Mid-C hydro generation. Not only had hydro operations changed due to increased flows but also due to a crack discovered in the Wanapum dam. This caused forebay elevation restrictions at the project and impacted PSE operations by reducing Mid-C capacity by [redacted] MW. In order to pass the increased

Mid-C hydro it was necessary to generate the Mid-C near maximum capacity. The ability to store water was also decreased due to the lowered maximum elevation at Wanapum.

From [redacted] through February 2014, Staff [redacted] [redacted] MW of on-peak power at an average price of $[redacted].36/MWh, [redacted] MW of off-peak power at an average price of $[redacted]/MWh and [redacted] MMBtu/day of natural gas at an average price of $[redacted]/MMBtu. Staff also [redacted] MW of on-peak power at an average price of [redacted]/MWh and [redacted] MMBtu/day of natural gas at an average price of [redacted]/MMBtu. Note that the majority of the power hedges were executed for a full quarter or calendar strip where market liquidity is far greater than an individual month. *See* Exhibit Nos. ___(DEM-6C) and ___(DEM-7C) for further detail of PSE's hedging activities for March 2014.

V. SUPPORTING EXHIBITS

The monthly exposure for March 2014 is included in Exhibit No.___(DEM-4C). The monthly MaR analysis for March 2014 can be found in Exhibit No.___(DEM-5C). March 2014 hedges are shown for both power and gas for power in Exhibit Nos. ___(DEM-6C) and ___(DEM-7C).

As of the 2012 water supply season, the Northwest River Forecast Center ("NWRFC") water supply forecasting procedures changed whereby Ensemble Streamflow Prediction ("ESP") generated forecasts replaced regression-based forecasts. Water supply forecasts were no longer released on a scheduled three times per month basis. The new ESP forecasts are published on the NWRFC website at a minimum of once a week but may be updated daily. There is no longer a NWRFC Final forecast for each month. The current

published forecast is designated as the NWRFC Official Forecast and is valid until it is replaced with an updated forecast. The 30-year average (1981-2010), referred to as "normal," for the January-July period at Grand Coulee is 59,599 KAF. The actual January-July 2014 runoff was 109 percent of normal at Grand Coulee, or 65,006 KAF. A graph of the NWRFC forecasts for the January through July 2014 period may be found in Exhibit No. ___(DEM-8). The monthly runoff volumes at Grand Coulee for water years 2012 through 2014 are also shown in Exhibit No. ___(DEM-8).

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 Exhibit No. ___(DEM-9C). Exhibit No. ___(DEM-10C) provides a summarized retrospective of the market prices and fundamentals over the hedging term [redacted] through [redacted] – all of which played a key role in Staff's management of, and hedging decisions for March 2014. The above referenced tools, forecasts, and fundamental views were used to manage the monthly spot market exposure for delivery month March 2014. March 2014 hedges were executed in accordance with both the Programmatically Managed Hedge and Actively Managed Hedge strategies and the hedge details are shown for both power and gas for power in Exhibit No. ___(DEM-6C).

Daily heat rate trends for March 2014 can be found in Exhibit No.___(DEM-11C), 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 are "in the money" and may dispatch economically.

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Daily commodity prices for March 2014 are in Exhibit No.___(DEM-12C). This chart illustrates on-peak power, off-peak power, and gas for power prices as they evolved over the [redacted] hedging period.