EXHIBIT NO. ___(DEM-3C)
DOCKET NO. UE-08___
PCA 6 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 2008 Power Cost Adjustment Mechanism Report**	**Docket No. UE-08____**

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

REDACTED VERSION

MARCH 31, 2008

PUGET SOUND ENERGY, INC.

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

PUGET SOUND ENERGY, INC.

ILLUSTRATION OF PSE'S PORTFOLIO AND RISK MANAGEMENT ACTIVITIES FOR PCA PERIOD 6 POWER SUPPLY FOR THE SINGLE MONTH APRIL 2007

I. INTRODUCTION

The purpose of this exhibit is to illustrate the manner in which Puget Sound Energy ("PSE" or "the Company") manages its electric portfolio, including risk management activities, by describing how PSE managed power supply and costs for a single month during PCA period 6: April 2007. Power and Gas Supply Operations Staff ("Staff") follow the Energy Management Committee ("EMC") approved programmatic hedging plan to guide them in the specific time periods and quantities of energy to hedge. In October 2007, the Company extended the term of the power hedging strategy from [redacted] to [redacted] months and augmented the active position management period from the first [redacted] months to the first [redacted] months. The prior strategy of an [redacted]-month term and a [redacted]-month active position management period was utilized for this PCA period 6 as well as for the specific month analyzed here, April 2007. This programmatic hedging plan is designed to reduce the Company's net power portfolio exposure starting [redacted] months in advance of delivery, subject to minimum and maximum exposure reduction, based upon a fundamental view. Staff can make recommendations to hedge further out in time, departing from this plan, but execution of such hedges are subject to EMC approval. Under this plan, the majority of the hedging strategies and transactions have been executed at least [redacted] months prior to delivery, leaving primarily only balancing transactions needed to respond to changes in market heat

rates and hydro conditions. Decisions for hedges made about 6 months or less prior to the month of delivery ("[redacted]", also referred to as "[redacted]"), are made by Staff under the limits described in PSE's Energy Supply Hedging and Optimization Procedures Manual ("Procedures Manual"). The EMC is responsible for providing oversight and direction on all portfolio risk issues in addition to approving long-term resource contracts and acquisitions.

II. HEDGING PLAN

On July 22, 2004, the EMC approved the Rolling [redacted]-Month Hedging Plan as recommended by Staff to guide hedging decisions [redacted] to [redacted] months prior to the month of delivery. The proposal authorizes Staff to use dollar cost averaging hedging, informed by Margin at Risk ("MaR") analysis, for a forward time frame of the next rolling [redacted] months past Staff's existing [redacted]-month purview, with defined minimum and maximum monthly exposure limits. *See* Exhibit No. ___(DEM-4C). This hedging plan increases Staff's ability to react to position changes due to stream or hydro flow variation, forced thermal plant outages, and changing market conditions.

The hedging plan 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 when each month falls into Staff's [redacted] purview. During this approximate [redacted] month purview, Staff manages the monthly net exposure in accordance with the Procedures Manual. (The exposure is calculated individually for peak, off-peak, and gas for power positions. The authority limit is calculated on the net spot exposure of all three. Spot market exposure is measured by multiplying the open position by the hourly

spot price.) *See* Exhibit No. ___(DEM-5C).

The "maximum" monthly hedge is calculated by dividing the total net exposure by the remaining months prior to the time when the position falls into the [redacted]-month purview. 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 6-month purview. If such a month's position already falls within the Director's limit authority, there is no monthly hedge requirement. (The Director has exposure authority up to the CFO level ($[redacted]); exposure above the CFO level requires notification to the EMC.)

Margin at Risk measures risk reduction as a result of incremental hedging. As PSE's hedging strategy evolved, the MaR concept was added to the evaluation process in May 2004 for hedge strategies [redacted] to [redacted] months out to measure risk reduction for various alternatives. 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 given a credit constrained environment. The MaR calculation shows the amount of portfolio risk removed for each hedging dollar spent when 25 MW power or 5,000-mmbtu/day gas is purchased.

The remainder of this report will illustrate the systems and tools used by Staff and their application for PCA Period 6 by describing actual hedging strategy decisions and their execution undertaken by PSE. Detailed explanation is provided in section V for one specific month – November 2005, with respect to power supply for delivery in April 2007. For all subsequent months, please reference section VI and VII which provides a summary

of December 2005 – April 2007, and reviews the analysis and fundamental views relied upon by Staff to make hedging decisions for April 2007. *See* Exhibit No. ___(DEM-4C) through Exhibit No. ___(DEM-14C) for additional detail supporting this narrative.

III. OCTOBER 2004

In October 2004, Staff entered into two long-term, fixed gas supply agreements to supply fuel for its gas-fired generating fleet for the period November 2005 through June 2008, as described in more detail in the Company's 2005 Power Cost Only Rate Case, Docket No. UE-050870. These contracts effectively replaced the 1993 CanWest contract that CanWest prematurely terminated in October 2005.

IV. JULY 2005

PSE employs the KW3000 risk system, a production cost model, to calculate portfolio risks. The April 2007 position was first calculated in the KW3000 risk system ("position report") July 19, 2005. At that time, the April 2007 total net exposure was [redacted] with a peak power short of [redacted] MW, off peak power short of [redacted] MW, and [redacted]-mmbtu/day natural gas short. Pursuant to the EMC approved hedging strategy tenor at that time, Staff did not recommend any specific action to be taken until November 2005, when the month of delivery was within the [redacted] month purview.

V. NOVEMBER 2005

In November 2005, April 2007 rolled into Staff's [redacted] month purview, with [redacted] months remaining until delivery. At the beginning of November, the position report indicated the

April 2007 net exposure was [redacted] with a[redacted] MW peak power short, [redacted] MW off-peak power short and [redacted]-mmbtu/day natural gas short. *See* Exhibit No. ___(DEM-6C). In this example, the current portfolio position indicates that [redacted] MW peak power to be purchased at the current market price, results in a peak power exposure of [redacted]. This exposure combined with the [redacted] natural gas exposure and [redacted] off-peak power exposure totals a net exposure of [redacted].

With [redacted] months remaining before April 2007 falls into Staff's [redacted] purview, the maximum reduction in exposure to be accomplished by Staff is approximately [redacted] and the minimum reduction is approximately [redacted].

Looking at delivery month April 2007, PSE's MaR analysis indicates the greatest exposure reduction would be purchasing [redacted]. *See* Exhibit No. ___(DEM-7C). For example, if 25 MW peak power was purchased for April 2007, it would reduce risk by [redacted] for every dollar spent, compared to [redacted] with the purchase of 5,000-mmbtu/day gas for power. Based on this analysis, greater risk reduction would be gained from the purchase of [redacted].

On-peak market heat rates (the product of the power price divided by the gas price) for April 2007 were anticipated to be in the [redacted] plus range. At that heat rate, the Company's [redacted] combustion turbines ("CT") would be, on a probabilistic basis, "out of the money". *See* Exhibit No. ___(DEM-8C).

In November 2005, as part of the Rolling [redacted]-Month Hedging Plan, Staff reviewed

market fundamentals and came up with a hedging strategy for April 2007. Staff noted that two months after Hurricanes Katrina and Rita struck the Gulf of Mexico, significant production still remained off-line, though prices had fallen to pre-Rita levels and approaching pre-Katrina levels. Staff noted the off-line volumes represent approximately 5-10% of the overall domestic energy market, and as we head into the high demand winter season, this situation could represent energy shortage risks to the U.S. natural gas market. However, record amounts of natural gas continue to be injected into storage – mainly a function of above normal temperatures on the East Coast, industrial demand destruction, and conservation, making the market feel more comfortable about winter supply adequacy. In addition, Pacific Northwest heat rates continue to weaken. Staff also noted the start of the 2006 water year for the Pacific Northwest looked positive. (October 2005 marked the start of a new water year. Water year 2006 is defined as October 2005 to September 2006.) Precipitation for September and October 2005 was more than 150% above average, while snow pack is slightly above normal. Because the Northwest River Forecast Center ("NWRFC") does not start predicting stream flow conditions until late December, the Company has contracted with a private vendor to model and generate forecasts for stream flow, snowmelt, and runoff in the Pacific Northwest. On November 20, 2005, the consultant released their first forecast of the 2006 water year predicting January-July runoff at [redacted] of normal at Grand Coulee. As a result of lower natural gas prices and uncertain hydro conditions for water year 2007, Staff recommended to hedge at [redacted] levels – noting that [redacted] hedge levels still represent only a small fraction of the overall short position in the rolling [redacted]-month period.

On November 7, 2005, Staff purchased [redacted] MW Mid-C [redacted] power for the period

April 2007 through June 2007 for [redacted]. *See* Exhibit No. ___(DEM-9C).

An overview of PSE's hedging activities for April 2007 can be found in Exhibit No. ___(DEM-10C). The hedges are charted by transaction date and transaction price for peak (also referred to as "heavy load" which represents hours ending 0700 through 2200), off peak (also referred to as "light load" which represents hours ending 2300 and 2400, and hours ending 0100 through 0600), and gas for power. The charts show the mid-mark (the average between the bid and the ask price) and the price at which the hedge was executed relative to the market price movement for April 2007. It may appear for some hedges, the transaction price is above the April 2007 mid-mark. This is a result of purchasing a hedge as a quarterly strip, also referred to as "Q2" which includes the months of April, May, and June. Because the price of power is valued differently for the individual months, the price for Q2 power was higher than that of the price of April power. Oftentimes, the forward power market – especially for delivery beyond six months from execution – does not trade as monthly strips until the delivery date approaches 4-6 months, only quarterly.

By the beginning of December 2005, the net exposure for April 2007 went from [redacted] to [redacted] as a result of the increase in gas prices over the previous month. *See* Exhibit No. ___(DEM-6C). The position report showed a [redacted] MW peak power short, [redacted] MW off peak power short, and [redacted]-mmbtu/day natural gas short.

Fundamental variables affecting supply for Q2-2007 include: gas prices (another active hurricane season could cause significant gas supply losses and production disruptions), weather, and precipitation (recall October 1, 2006 marks the start of the new water year).

VI. DECEMBER 2005 – APRIL 2007

During the months December 2005 through October 2006, Staff managed the April 2007 spot market exposure similar to the previous month – pursuant to the rolling [redacted]-month hedging strategy – with an eye towards market conditions and fundamentals, water supply, and weather.

A record 27 named storms formed during the 2005 season; 14 of those formed into hurricanes; 7 of those classified as major hurricanes (Category 3 or higher); and 4 of those reached Category 5 status – breaking the old record of two Category 5 hurricanes set in 1960 and 1961 (NCDC). In addition, the 2005 hurricane season was the most destructive – largely due to Hurricane Katrina, with damage estimates exceeding $100 billion. By the end of November 2005, 38% of all Gulf of Mexico crude oil production remained off-line (564,000 barrels per day) and 30% of all Gulf of Mexico natural gas production remained off-line (3 Bcf/day); cumulative hurricane related losses totaled 93 million barrels of crude oil, and 492 Bcf of natural gas. The West continued to have record storage inventories, but overall US winter supply concerns continued to create fear, uncertainty and a high price environment. As a result of the active hurricane season, natural gas prices were very volatile; Sumas April 2007 natural gas prices hit $8.84/mmbtu in December 2005 – up over $2/mmbtu since Hurricane Katrina hit. *See* Exhibit No. ___(DEM-11).

In November 2006, April 2007 rolled into Staff's [redacted] purview, allowing Staff to more actively manage the position by responding to short-term market fundamentals. Staff continued to closely monitor the hydro situation as the new water year was beginning to unfold. Staff continued to hedge by purchasing [redacted] until heat rates began to fall in

March, making our position [redacted] as the Company's CT's, on a probalistic basis, [redacted]. On March 1, 2007, the Northwest River Forecast Center ("NWRFC") issued their Early Bird forecast, increasing the runoff forecast to 106% of normal at Grand Coulee for the January-July period (up 4% from the previous forecast in February 2007). Responding to the changes in market heat rates, above normal temperatures, no hurricane impact on supply, and forecasted robust stream flows from spring run off – Staff determined to sell just under [redacted]-mmbtu/day April 2007 physical natural gas during the month of March 2007, as market heat rates began to decline.

VII. FUNDAMENTALS AND MARKET PRICES AFFECTING APRIL 2007

From November 2005 to April 2007, forward prices for power and natural gas were volatile, as a result of the changing market, hydro, and weather conditions. As a result of the volatile prices, market heat rates fluctuated over the [redacted]; peak heat rates ranged from as low as [redacted] to as high as [redacted] while off-peak ranged from as low as [redacted] to as high as [redacted]. Pursuant to the rolling [redacted]-month hedge strategy, Staff ratably reduced the net exposure of its power portfolio. Heading into delivery month April 2007, the position was relatively flat as a result of the hedges Staff had transacted. Beginning April 1, 2007, Staff managed the position on a daily basis.

Monthly spot market exposure for April 2007 over the period November 2005 through March 2007 can be found in the exposure charts in Exhibit No. ___(DEM-6C). These charts illustrate peak power, off-peak power, and gas for power exposure as they

evolve over the [redacted]-month period and contains our monthly hedging strategy for the rolling [redacted]-month period. (Note that the rolling [redacted]-month hedging strategy can vary for a specific month during that period if Staff's fundamental view warrants accelerating or decelerating that hedging strategy. For example, in September 2006, the hedging strategy for the rolling [redacted]-month period was to hedge to [redacted] exposure reduction limits, except for Q3 and Q4-2007, Staff recommended to hedge to [redacted] exposure reduction limits for Q3 and Q4-2007 as prices continued to decline throughout September 2006, and therefore, Staff determined the downside price targets had been achieved with such a price move. Staff noted that bullish market factors still existed beyond the near term including: another month of hurricane season remained; no clear winter weather pattern had emerged; gas fired power generation on the rise and was expected to displace some of the coal units in the West; and the economy growing steadily at about 3%, therefore demand will continue to increase while large amounts of new supplies are limited.

Monthly MaR analysis for April 2007 can be found in Exhibit No. ___(DEM-7C). As stated previously, MaR analysis shows how much risk reduction is gained by month and by strategy – providing Staff with an additional tool to evaluate which commodity to hedge given a credit constrained environment.

Daily heat rate trends for April 2007 can be found in Exhibit No. ___(DEM-8C). Heat rates fluctuate daily depending on the power and gas prices, and are part of the dispatch logic used to determine which CT's are "in the money".

Daily commodity prices for April 2007 can be found in Exhibit No. ___(DEM-11). This chart illustrates peak power, off-peak power, and gas for power prices as they evolved

over the 18-month period.

The NWRFC issued its first official water supply forecast of the 2007 water year on December 21, 2006. Thousands of Acre Feet ("KAF") for the January-July period at Grand Coulee was projected at 66,700 KAF. The 30-year average (1971-2000), also referred to as "normal" for the January-July period at Grand Coulee is 62,900 KAF. Thus, NWRFC predicted January-July runoff at 106% of normal at Grand Coulee (66,700 KAF/62,900 KAF). All subsequent forecasts for the 2007 water year can be found in Exhibit No. ___(DEM-12). Also found in Exhibit No. ___(DEM-12) are the monthly runoff volumes at Grand Coulee for water years 2005, 2006, 2007, and October through February for water year 2008.

Staff's monthly Fundamental Summaries and Energy Market Executive Reports can be found in Exhibit No. ___(DEM-13C) and Exhibit No. ___(DEM-14C). The monthly Fundamental Summaries by Staff offer an overview of the power and natural gas markets, weather, oil, and hydro as they relate to the rolling [redacted]-month hedging strategy. The Energy Market Executive Reports provide an overview on such topics as Western and North American markets, regulatory affairs, infrastructure, global energy trends, and other related energy topics. The Fundamental Summaries start the last week of November 2005, and the Energy Market Executive Reports were first initiated in October 2005.

The above referenced tools, forecasts, and fundamental views were used to manage the monthly spot market exposure for delivery month April 2007. April 2007 hedges were executed in accordance with the rolling [redacted]-month hedging strategy and the hedges are shown for both power and gas for power in Exhibit No. ___(DEM-9C).

VIII. APRIL 2007 – WITHIN MONTH OVERVIEW

Spot prices increased in April from March as the call on gas-fired generation rose as heat rates strengthened, lower hydro production, increased availability of southbound transmission, and a brief unplanned outage at the Columbia Generating Station.

Despite the many challenges Staff faced while hedging for the period April 2007 (including unknown hydro conditions and weather, significant hurricane damage and production losses), Staff succeeded in executing transactions at competitive market prices. From November 2005 to April 2007, Staff purchased [redacted] MW peak power at an average price of [redacted] and [redacted] MW off peak power at an average price of [redacted]. From October 2004 to April 2007, Staff purchased [redacted]-mmbtu natural gas at an average price of [redacted]/mmbtu. Two metrics are considered when evaluating hedge results. The first is the comparison of the weighted price of the forward hedges versus the mid-market average over the life of a specific hedge strategy. This metric indicates PSE Staff reduced power costs by roughly [redacted], through ratable, well-timed hedge execution. The second metric is the comparison of the weighted price of forward hedges versus the latest mark, the latter a proxy for the spot price. Using this metric, PSE Staff reduced power costs by about [redacted] through the use of the programmatic hedge strategy, as opposed to leaving the open commodity exposure to the spot market. *See* Exhibit No. ___(DEM-10C).