**EXHIBIT NO. \_\_\_(RJR-1CT)**

**DOCKETS UE-17\_\_\_\_/UG-17\_\_\_\_**

**2017 PSE GENERAL RATE CASE**

**WITNESS: RONALD J. ROBERTS**

**BEFORE THE**

**WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

|  |  |
| --- | --- |
| **WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION,****Complainant,****v.****PUGET SOUND ENERGY,****Respondent.** | **Docket UE-17\_\_\_\_Docket UG-17\_\_\_\_** |

**PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF**

**RONALD J. ROBERTS**

**ON BEHALF OF PUGET SOUND ENERGY**

**Redacted**

**Version**

**JANUARY 13, 2017**

**PUGET SOUND ENERGY**

**PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF
RONALD J. ROBERTS**

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**PUGET SOUND ENERGY**

**PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF
RONALD J. ROBERTS**

# I. INTRODUCTION

Q. Please state your name, business address, and position with Puget Sound Energy.

A. My name is Ronald J. Roberts. My business address is 10885 N.E. Fourth Street Bellevue, WA 98004. I am the Director of Thermal Resources for Puget Sound Energy. (“PSE”).

Q. Have you prepared an exhibit describing your education, relevant employment experience, and other professional qualifications?

A. Yes, I have. It is Exhibit No. \_\_\_(RJR-2).

Q. What are your duties as Director of Thermal Resources for PSE?

A. I plan, organize, and direct PSE’s thermal energy production including operations and maintenance of PSE’s owned and jointly-owned generating facilities and PSE’s thermal purchased power agreements. Furthermore, I assist PSE’s Resource Acquisition team in performing due diligence evaluations of potential thermal resource acquisitions. I am responsible for overseeing the safe operation of PSE's natural gas and coal generation plants and optimizing their operation in a manner that will benefit our customers and develop our employees to their maximum potential.

Q. Please summarize your testimony.

A. First, I discuss how PSE’s decision to transition from the use of Colstrip Units 1 & 2 in a measured and thoughtful way provides a clearer pathway for reduced risk to PSE’s customers and reduction of carbon emissions without compromising reliability. Second, I provide an overview of the rate year production operations and maintenance (“O&M”) expense and discuss the O&M expense for PSE’s thermal, hydroelectric, and wind generation facilities, including major maintenance, as applicable.

# II. CLOSURE PLAN FOR COLSTRIP UNITS 1 & 2

## A. Background

### 1. Overview of Colstrip Units 1 & 2

Q. Please describe Colstrip Units 1 & 2.

A. Colstrip Units 1 & 2 consist of two coal-fired steam electric plant units located in eastern Montana about 120 miles southeast of Billings, Montana. Colstrip Units 1 & 2 began operation in 1975 and 1976, respectively, and each unit produces up to 307 megawatts (“MW”) net.

Each of Colstrip Units 1 & 2 consists of a fuel supply system, a coal-fired boiler, a steam turbine-generator, a cooling tower, step-up transformers, piping, and electric distribution and auxiliary equipment. Colstrip Units 1 & 2 are paired, sharing certain common systems. In addition, Colstrip Units 1 & 2 and Colstrip Units 3 & 4 share certain common facilities (administrative buildings, supply warehouse, water supply system, transmission lines etc.). Figure 1 provides a simplified illustration of how each of Colstrip Units 1 & 2 generates electricity.

**Figure 1. How Colstrip Units 1 & 2 Generate Electricity**



Colstrip Units 1 & 2 were constructed adjacent to the Rosebud Coal Mine, a surface mine originally established to supply coal to locomotives of the Northern Pacific Railroad. Rosebud Mine produces low-sulfur, sub-bituminous coal with an approximate heating value of 8400 BTU per pound, and the coal is delivered to the plant by coal haulers. Coal from the Rosebud Mine is crushed into 3-inch chunks and transported to the generating plant on overland conveyors or in trucks where it is stored in piles at the plant site before being moved to silos in the boiler buildings. The coal travels through a pulverizer that grinds it to the consistency of talcum powder. The pulverized coal is then mixed with air and blown into the boiler. Inside the boiler, the coal and air mixture burns, releasing hot gases that convert water in boiler tubes to steam. The steam powers turbines connected to electric generators, which transform the mechanical energy from the turbine into electric energy.

Once combustion is completed, the hot gases are drawn into a set of scrubbers and cleaned to minimize pollutants emitted before being exhausted through the stack. Bottom ash and fly ash are two residuals created from coal combustion. Bottom ash, the heavier of the two residuals, sinks to the bottom of the boiler where it is collected for storage. The lighter fly ash is pulled into the scrubbers with the flue gases, where it is captured for storage. The scrubbers also capture sulfur and mercury released from the coal during combustion.

Q. Please describe the arrangements for water used for operations at Colstrip Units 1 & 2.

A. Water for Colstrip Units 1 & 2 operations is pumped 37 miles from the Yellowstone River to a man-made lake constructed as part of the plant facilities. The pumping station at the Yellowstone River and two thirty-seven mile long pipelines are owned and operated as a jointly-owned facility of Colstrip Units 1 & 2 and Colstrip Units 3 & 4. The lake (Castle Rock Lake) is large enough to provide a thirty-day supply of water.

As water enters the plant, it is divided into two streams. Most of the water is directed to the cooling towers where it replaces water lost from evaporation, the rest is used for various processes including equipment cooling and scrubber system make-up. Water to be used in the boilers is demineralized before entering a closed-loop system that passes through the boiler and turbine system. It is then condensed and passes into a hot well where the cycle begins again. The water from Castle Rock Lake is also used to provide water to the city of Colstrip, Montana.

Q. Please describe the ownership structure for Colstrip Units 1 & 2.

A. PSE and Talen Montana LLC (“Talen Montana”) each owns a 50 percent, undivided interest in the generating plants and related facilities of Colstrip Units 1 & 2. Talen Montana is an independent power producer and is not subject to regulation by a state public service commission. On December 6, 2016, Riverstone Holdings LLC, a private investment firm focused on the energy and power industry, indirectly acquired all of the interests in Talen Montana.

Q. What agreements govern the ownership and operations of Colstrip Units 1 & 2?

A. The following three agreements govern the ownership and operations of Colstrip Units 1 & 2:

(i) the Construction and Ownership Agreement, dated as of July 30, 1971, by and between The Montana Power Company and the Puget Sound Power & Light Company (the “Colstrip Units 1 & 2 Construction and Ownership Agreement”);

(ii) the Agreement for the Operation and Maintenance of Colstrip Steam Electric Generating Station, dated as of July 30, 1971, by and between The Montana Power Company and the Puget Sound Power & Light Company (the “Colstrip Units 1 & 2 Operation and Maintenance Agreement”); and

(iii) the Common Facilities Agreement, dated as of May 6, 1981, by and between The Montana Power Company, Puget Sound Power & Light Company, Puget Colstrip Construction Company, The Washington Water Power Company, Portland General Electric Company, Pacific Power & Light Company, and Basin Electric Power Cooperative (the “Colstrip Common Facilities Agreement”).

The Colstrip Units 1 & 2 Construction and Ownership Agreement provides for the terms and conditions of the construction and ownership of Colstrip Units 1 & 2. Please see Exhibit No. \_\_\_(RJR-3) for a copy of the Colstrip Units 1 & 2 Construction and Ownership Agreement, as amended and revised.

The Colstrip Units 1 & 2 Operation and Maintenance Agreement provides for the terms and conditions of the operation and maintenance of Colstrip Units 1 & 2. Please see Exhibit No. \_\_\_(RJR-4) for a copy of the Colstrip Units 1 & 2 Operation and Maintenance Agreement, as amended and revised.

The Colstrip Common Facilities Agreement provides the terms and conditions for allocating the use and costs, and operation and maintenance, of certain facilities that are common to Colstrip Units 1 & 2 and Colstrip Units 3 & 4. These common facilities include, for example, 115 kV and 230 kV start-up transmission lines. Please see Exhibit No. \_\_\_(RJR-5) for a copy of the Colstrip Common Facilities Agreement, as amended and revised.

Q. Please describe the coal supply agreement for Colstrip Units 1 & 2.

A. Western Energy Company provides the coal supply for Colstrip Units 1 & 2 pursuant to the terms and conditions of the Coal Purchase and Sale Agreement, dated as of March 21, 2007, by and among PPL Montana, LLC (now Talen Montana), Puget Sound Energy, and Western Energy Company (the “Coal Purchase and Sale Agreement”). Please see Exhibit No. \_\_\_(RJR-6) for a copy of the Coal Purchase and Sale Agreement, as amended and revised.

Q. Please describe the Colstrip Project Transmission System.

A. The Colstrip Project Transmission System was built in the mid-1980s and is jointly owned by Avista Corporation (“Avista”), NorthWestern Corporation (“NorthWestern”), PacifiCorp, Portland General Electric Company (“Portland General”), and PSE pursuant to the terms and conditions of the Colstrip Transmission Agreement. The Colstrip Project Transmission System consists of a 500 kilovolt (kV) transmission system in two segments:

(i) a segment between Colstrip, Montana, and Broadview, Montana, and

(ii) a segment between Broadview, Montana and Townsend, Montana (there is no substation at Townsend, Montana).

The Bonneville Power Administration (“BPA”) owns and operates a 500 kV double circuit transmission system between Townsend, Montana and Garrison, Montana (commonly referred to as the Eastern Intertie), which connects the Colstrip Project Transmission System to the Federal Columbia River Transmission System. Figure 2 provides a simplified illustration of the Colstrip Project Transmission System, the Eastern Intertie, and the Federal Columbia River Transmission System.

**Figure 2. Colstrip Project Transmission System,
Eastern Intertie, and Federal Columbia River Transmission System**



Q. Please describe the ownership structure for Colstrip Project Transmission System.

A. The Amended and Restated Colstrip Project Transmission Agreement, dated as of September 27, 2013, by and among NorthWestern Corporation, Puget Sound Energy, Avista Corporation, Portland General Electric Company, and PacifiCorp (the “Colstrip Project Transmission Agreement”) provides for the engineering, design, and construction of the Colstrip Project Transmission System. Please see Exhibit No. \_\_\_(RJR-7) for a copy of the Colstrip Project Transmission Agreement, as amended and revised.

Each party to the Colstrip Project Transmission Agreement is to contribute to the transmission facilities’ costs, including operations and maintenance costs, and is to receive an undivided ownership interests in the transmission facilities as a tenant in common. Each party to the Colstrip Project Transmission Agreement is entitled to use its share of capacity in the respective segments of the Colstrip Project Transmission System identified in Table 1 below:

**Table 1. Capacity Shares of the Respective Segments of the
Colstrip Project Transmission System**

|  |  |  |
| --- | --- | --- |
| **Ownership** | **Colstrip-Broadview** | **Broadview-Townsend** |
| NorthWestern | 36% | 24% |
| Puget Sound Energy | 33% | 39% |
| Portland General Electric | 14% | 16% |
| Avista Corporation | 10% | 12% |
| PacifiCorp | 7% | 8% |

Q. Does PSE rely on transmission agreements other than the Colstrip Project Transmission Agreement for the transmission of Colstrip Units 1 &2 generation to PSE’s loads?

A. Yes. PSE relies on the following two additional transmission agreements for the transmission of Colstrip Units 1 & 2 generation to PSE’s loads:

(i) the Transmission Agreement, dated as of July 30, 1971, by and between The Montana Power Company and Puget Sound Power & Light Company (the “Colstrip Units 1 & 2 Transmission Agreement”) and

(ii) the Amended and Restated Transmission Agreement, dated as of April 17, 1981, by and between the United States of America, Department of Energy, acting by and through the Bonneville Power Administration, The Montana Power Company, Pacific Power & Light Company, Portland General Electric Company, Puget Sound Power & Light Company, The Washington Water Power Company, and Basin Electric Power Cooperative (the “Montana Intertie Agreement”).

The Colstrip Units 1 & 2 Transmission Agreement provides the terms and conditions for the transmission of PSE’s share of the output of Colstrip Units 1 & 2 across NorthWestern’s transmission system to points of interconnection described in the agreement. Please see Exhibit No. \_\_\_(RJR-8) for a copy of the Colstrip Units 1 & 2 Transmission Agreement, as amended and revised.

The Montana Intertie Agreement provides the terms and conditions for the construction, operation, and use of a regional transmission intertie (the “Montana Intertie”) to interconnect the Colstrip generating facilities to BPA’s Federal Columbia River Transmission System. The Montana Intertie runs between the Broadview Substation and the Garrison Substation in the vicinity of Deer Lodge, Montana. Please see Exhibit No. \_\_\_(RJR-9) for a copy of the Montana Intertie Agreement, as amended and revised.

### 2. Operator of Colstrip Units 1 & 2

Q. What entity acts as plant operator of Colstrip Units 1 & 2?

A. Talen Montana currently acts as plant operator of Colstrip Units 1 & 2 and as plant operator of Colstrip Units 3 & 4. As plant operator, Talen Montana acts as agent for Colstrip Units 1 & 2 owners and has a responsibility to operate, maintain, hire personnel, and pay all necessary costs. A committee of owner representatives (one from each owner) facilitates cooperation, information exchange, and management oversight for Colstrip Units 1 & 2.

Q. Does Talen Montana intend to continue to act as plant operator of Colstrip?

A. No. In May 2016, Talen Montana provided notice of its intention to resign as plant operator for Units 3 & 4 of the Colstrip Steam Electric Generating Station, effective May 23, 2018. The decision of Talen Montana to cease as plant operator is in the context of frequent corporate restructuring that has created considerable business uncertainty and created a level of risk that PSE took into consideration as it evaluated the future of Colstrip Units 1 & 2.

Q. Please describe the corporate restructuring of the joint owner of Colstrip Units 1 & 2.

A. Over the past 24 months, PSE has dealt with three different owners as its 50% partner in Colstrip Units 1 & 2.

Prior to June 2015, PSE’s partner in Colstrip Units 1 & 2 was PPL Montana, a subsidiary of PPL Corporation, headquartered in Allentown, Pennsylvania.

On July 1, 2015, the competitive power generation assets of PPL Corporation and the competitive generation assets of Riverstone Holdings LLC were combined to create a new corporation, Talen Energy. Following the creation of Talen Energy, PPL shareholders owned 65% of Talen Energy’s common stock and affiliates of Riverstone Holdings LLC owned 35% of Talen Energy’s common stock.

On June 3, 2016, Talen Energy entered into an agreement with Riverstone Holdings LLC, pursuant to which Riverstone Holdings LLC would acquire the outstanding stock of Talen Energy. This transaction closed on December 6, 2016, and Riverstone Holdings LLC is now the parent company of Talen Montana.

Q. What actions are the owners of Colstrip Steam Electric Generating Station taking to replace Talen Montana as plant operator?

A. The owners of Colstrip Units 1 & 2 and the owners of Colstrip Units 3 & 4 are currently engaged in a due diligence process to structure a new legal entity to manage units of the Colstrip Steam Electric Generating Station and hire a third party to act as plant operator in the event that no other owner opts to step in as plant operator.

### 3. Budgets of Colstrip Units 1 & 2

Q. What is PSE’s share of the operating and capital budgets for Colstrip Units 1 & 2 for 2018?

A. PSE’s share of the production and operating budget for Colstrip Units 1 & 2 for 2018 is projected to be $23,020,645. PSE’s share of the capital budget for Colstrip Units 1 & 2 for 2018 is projected to be $10,114,600.

Q. How are the budgets for Colstrip Units 1 & 2 developed?

A. The operating budget for Colstrip Units 1 & 2 is determined by the plant operator (i.e., Talen Montana) and approved via a voting process by the plant owners committee. The plant operator develops the proposed operating and capital budgets for the upcoming year and presents the budgets to the Owners Committees by September 1 of each year. (There are separate committees for Colstrip Units 1 & 2 and Colstrip Units 3 & 4.) Voting (based upon ownership share) on the budget proposed by the operator is to be done before November 1 of each calendar year. Each owner’s share of the budget is based on its ownership share of the units.

Q. Have the owners proposed changes in the capital budget for Colstrip Units 1 & 2?

A. Yes. Given a recent legal settlement, described later, that mandates the retirement of the boilers of Colstrip Units 1 & 2 by July 1, 2022, Talen Montana has proposed a decrease in the capital spending for Colstrip Units 1 & 2. The goal is to operate Colstrip Units 1 & 2 in a safe and efficient manner but not spend money unnecessarily given an impending closure date (i.e., by July 1, 2022).

Q. What is the projected magnitude of savings associated with the decrease in the capital spending for Colstrip Units 1 & 2?

A. A retirement date for the boilers of Colstrip Units 1 & 2 by July 1, 2022, will result in approximately $34,215,000 in reduced capital spending at Colstrip Units 1 & 2 based on the 10 year capital spending plan provided by Talen Montana.

### 4. Environmental Impact Measures at Colstrip Units 1 & 2

Q. What additional environmental related rules, laws, or regulations affect (or may affect) operations at Colstrip Units 1 & 2?

A. Several current and potential federal and state rules affect operations at Colstrip Units 1 & 2. These include, for example, the Mercury and Air Toxics (MATS) Rule, the Regional Haze Rule, the Coal Combustion Residuals Rule, Clean Water Act rules, the National Ambient Air Quality Standards (NAAQS), and section 111(d) of the Clean Air Act.

Q. Has PSE prepared an exhibit describing the current and potential federal and state rules affecting operations at Colstrip Units 1 & 2?

A. Yes. PSE provided a description of the current and potential federal and state rules affecting operations at Colstrip Units 1 & 2 in Appendix K (Colstrip) to PSE’s 2015 Integrated Resource Plan. Please see Exhibit No. \_\_\_(RJR-10) for an updated description of the current and potential federal and state rules affecting operations at Colstrip Units 1 & 2 since PSE published Appendix K (Colstrip) to PSE’s 2015 Integrated Resource Plan.

Q. What steps have been taken at Colstrip Units 1 & 2 to reduce the environmental impact of coal combustion?

A. Each of Colstrip Units 1 & 2 is in compliance with all current state and federal environmental laws and regulations. The owners have taken measures to reduce environmental impacts associated with nitrogen oxides, mercury, sulfur dioxides, particulate matter, and coal combustion residuals (“CCRs”).

Q. What steps have been taken at Colstrip Units 1 & 2 to reduce the environmental impact of nitrogen oxides?

A. Coal and air leaving the pulverizers passes though burner systems and over-fire air systems that cool the flame temperature and reduce the formation of nitrogen oxides. Colstrip Units 1 & 2 use a second-generation low-nitrogen oxides combustion system with a close-coupled over-fire air injection. Digital control systems recently installed on Colstrip Units 1 & 2 enhance nitrogen oxides emissions control. In 2016, SmartBurn—an optimized combustion system installed in the boilers that helps to decrease the amount of nitrogen oxides formed during the combustion process—was added to Colstrip Unit 2 to further reduce nitrogen oxides emissions.

Q. What steps have been taken at Colstrip Units 1 & 2 to reduce the environmental impact of mercury?

A. Coal contains mercury. To oxidize the mercury and enhance its capture, the coal is treated with a bromine solution before entering the boiler. Then, flue gases are treated with powdered activated carbon to capture the mercury before the gases enter the scrubbers; there, the activated carbon and mercury are removed along with other particulate matter.

Q. What steps have been taken at Colstrip Units 1 & 2 to reduce the environmental impact of sulfur dioxide and particulate matter?

A. Permit specifications limit the amount of sulfur in the coal fuel. Additionally, Colstrip Units 1 & 2 remove sulfur dioxide from flue gases using wet alkali scrubbers. These scrubbers use the alkalinity of fly ash and/or hydrated lime to capture sulfur dioxide. Then, a water spray collects the fly ash and the captured mercury for further processing. This process also captures particulate matter.

Q. What steps have been taken at Colstrip Units 1 & 2 to reduce the environmental impact of CCRs?

A. Two types of ash are produced by coal combustion, bottom ash and fly ash. Bottom ash makes up 30 to 35 percent of the total. Fly ash makes up the remainder. The larger and heavier bottom ash falls into a water-filled trough in the bottom of the boiler; from there it is pumped to settling ponds on the plant site and then to permanent storage ponds. Some bottom ash is used as a construction material. The smaller and lighter fly ash and other particulate matter passes into the scrubbers with the flue gases.

The scrubbers use the fly ash’s alkalinity or hydrated lime to capture sulfur dioxide gases, and a water spray removes the fly ash and other particulate matter. The resulting scrubber slurry is piped to storage ponds. Before final placement in the storage “ponds,” paste plants remove most of the water from the slurry to create a paste. The paste, which begins the process at about 65 percent solids, sets up like low-grade concrete after several days.

The original ash holding ponds at Colstrip Units 1 & 2 were designed with highly impermeable clay liners to prevent slurry components from seeping into the groundwater. These conformed to the requirements of the Montana Major Facility Siting Act Certificate. Monitoring wells, installed prior to the start of operations, monitor the groundwater for any sign of possible contamination (pond water seepage), and capture wells pump impacted ground water back to the ponds.

Since 2000, projects have been completed and there are other projects ongoing to manage ash ponds, reduce potential for migration of affected groundwater and to upgrade plant wastewater systems to allow increased recycling of water.

## B. Litigation Affecting the Colstrip Steam Electric Generating Station

Q. Please provide a description of the recently concluded litigation pertaining to the Colstrip Steam Electric Generating Station.

A. Two sets of litigation pertaining to the Colstrip Steam Electric Generating Station have recently concluded. The first was an action brought by Sierra Club and Montana Environmental Information Center that allege violations of the Clean Air Act at the Colstrip Steam Electric Generating Station. The second was an action brought by Montana Environmental Information Center and Earthjustice (formerly Sierra Club Legal Defense Fund, a nonprofit that represents Sierra Club and other environmental nonprofit organizations on legal issues) against the Montana Department of Environmental Quality pertaining to the Agreed Order on Consent Regarding Impacts Related to Wastewater Facilities entered into with PPL Montana, LLC (now Talen Montana), the plant operator.

### 1. Litigation Alleging Violations of the Clean Air Act at the Colstrip Steam Electric Generating Station

Q. Please describe the action brought by Sierra Club and Montana Environmental Information Center that alleged violations of the Clean Air Act at the Colstrip Steam Electric Generating Station.

A. The Sierra Club and Montana Environmental Information Center provided notice on July 25, 2012 that they would sue for alleged violations of the Clean Air Act at the Colstrip Steam Electric Generating Station. The complaint in the case was filed on March 6, 2013 and alleged that the Colstrip Steam Electric Generating Station had violated the Clean Air Act by undertaking major repairs without a permit that would have required the installation of best available pollution control technology.

Several amended complaints were filed, and at one point, plaintiffs alleged that 73 projects undertaken at the Colstrip Steam Electric Generating Station facility violated the Clean Air Act. Through amendment of the complaint and favorable court decisions, the number of claims was greatly reduced. Ultimately, claims related to two projects (one project at Colstrip Unit 1 and one project at Colstrip Unit 3) were set for trial in May 2016.

### 2. Litigation Alleging Violations of the Agreed Order on Consent Regarding Impacts Related to Wastewater Facilities

Q. Please describe the action brought by Montana Environmental Information Center and Earthjustice that alleged violations of the Agreed Order on Consent Regarding Impacts Related to Wastewater Facilities.

A. Two lawsuits were originally filed in fall 2012 by the Montana Environmental Information Center and Earthjustice (formerly Sierra Club Legal Defense Fund, a nonprofit that represents Sierra Club and other environmental nonprofit organizations on legal issues) against the Montana Department of Environmental Quality pertaining to the Agreed Order on Consent Regarding Impacts Related to Wastewater Facilities entered into with PPL Montana, LLC (now Talen Montana), the plant operator. This litigation included a mandamus action and a petition for review. The petition for review was originally filed with Montana Board of Environmental Review alleging that the Agreed Order on Consent Regarding Impacts Related to Wastewater Facilities is an improper enforcement action and violates Montanans’ constitutional right to a clean and healthful environment. The Montana Department of Environmental Quality was the original defendant, but the operator of the Colstrip Steam Electric Generating Station intervened and removed the petition for review to Montana state court. Meanwhile, the mandamus action was dismissed in 2013.

## C. Factors Considered By PSE Regarding the Future of Colstrip Units 1 & 2

Q. What factors did PSE consider regarding the future of Colstrip Units 1 & 2?

A. Although Colstrip Units 1 & 2 operate safely and are well maintained, both units have now passed forty years of service. Additionally, economic pressures, environmental regulations, and ongoing legal matters make it important for Talen Montana and PSE to assess the future of the units. In evaluating the future of Colstrip Units 1 & 2, PSE looked at a myriad of factors, including the following:

* present and future state of the electricity market in the United States;
* existing and potential federal and state policy changes with respect to coal-fired generation units;
* economics specific to Colstrip Units 1 & 2;
* operational considerations related to water management with respect to Colstrip Units 1 & 2;
* current and potential future environmental regulations applicable to Colstrip Units 1 & 2; and
* the Coal Purchase and Sale Agreement for coal supply to Colstrip Units 1 & 2.

Additionally, given PSE’s undivided joint interest in Colstrip Units 1 & 2, PSE considered Talen Montana’s interests in the units, including the viability, economics, and risk of PSE running the units with and without Talen Montana’s participation.

### 1. Present and Future State of Electricity Markets in the United States

Q. Has the present and future state of electricity markets in the United States affected Colstrip Units 1 & 2?

A. Yes. The volatility of electricity markets in the United States has been especially problematic for Colstrip Units 1 & 2. As previously mentioned, Talen Montana has an undivided fifty percent ownership interest in Colstrip Units 1 & 2. As an independent power producer, Talen is more sensitive to energy market volatility than an investor-owned utility, such as PSE and the majority of other owners of Colstrip Units 3 & 4.

Nationally, this electricity market volatility has led some energy companies to sell independent power producer assets. Duke Energy, for example, sold its unregulated energy assets to Dynergy, while PPL and Riverstone spun off their unregulated assets to create Talen Energy.

Additionally, there have been a relatively high number of coal generating facilities retired over the past few years. In March 2016, the U.S. Energy Information Administration reported that nearly 18 gigawatts (GW) of electric generating capacity was retired in 2015, a relatively high amount compared with recent years. More than 80% of the retired capacity was conventional steam coal, with more than 200 coal plants having closed in the past five years. Please see Exhibit No. \_\_\_(RJR-11) for a copy of the report issued by the U.S. Energy Information Administration in March 2016.

### 2. Existing and Potential Federal and State Policy Changes With Respect to Coal-Fired Generation Units

Q. Have existing and potential federal and state policy changes with respect to coal-fired generation units affected Colstrip Units 1 & 2?

A. Yes. The use of coal to generate electricity has come under increasing public scrutiny over the past decade, and lawmakers in some states are increasingly exploring legislation that affects fossil fuel use.

In Washington State, the Greenhouse Gas Emissions Performance Standards (RCW 80.80.040) and the Energy Independence Act (Chapter 19.285 RCW) have affected the use of fossil fuel generation. The state legislature has also considered cap and trade programs and variations of carbon pricing models. Through executive rulemaking, the state has implemented the Washington Clean Air Rule.

Additionally, citizens have taken direct action by proposing initiative measures to price the externalities associated with the use of fossil fuels, such as the recently failed attempt to pass Initiative 732, which would have implemented a carbon tax. Coal emits approximately 30% more greenhouse gases than natural gas and creates additional exposure for companies and their customers when a carbon price is added to the cost of electricity.

### 3. Economics Specific to Colstrip Units 1 & 2

Q. Have commodity prices affected Colstrip Units 1 & 2?

A. Yes. Commodity prices are central to energy production and dispatch. Recent increases in natural gas production have driven electricity prices lower, thereby making natural gas an attractive fuel to replace older coal units. According to the U.S. Energy Information Administration, the amount of power produced from natural gas increased by over 200,000 gigawatt hours (GWh) between 2014 and 2015 alone.[[1]](#footnote-2)

Furthermore, natural gas is now generally cheaper to extract and transport than coal. The development of a cheaper and more readily available energy source has sharply driven down the price of energy. In fact, the price has fallen below the profit margin of producing coal at many older plants. The effect of cheap natural gas driving energy prices down to an unprofitable level for coal has been the topic of news stories.

Q. Have commodity prices affected Talen Montana’s operations at Colstrip Units 1 & 2?

A. Yes. An article in The Billings Gazette from May 2016 summarizes the difficulties encountered by Talen Montana in profitably generating power at Colstrip Units 1 & 2 as follows:

Talen CEO Paul Farr said earlier this month that his company “will lose millions in terms of operating Colstrip through the balance of the year.” The market price of electricity, largely because of cheap natural gas, has fallen below the profit margin of coal-fired power.

Talen is more vulnerable to market prices than Colstrip’s other owners because it is unregulated. The other Colstrip owners are regulated utilities guaranteed fixed profit percentages by the states in which they do business.

Talen reported a $341 million net loss in 2015. The company’s value has fallen 70 percent since it was spun off of Pennsylvania Power and Light.[[2]](#footnote-3)

The Institute for Energy Economics and Financial Analysis published a report about Colstrip Units 1 & 2, which reported that the profitability of Colstrip Units 1 & 2 for PPL Montana (now Talen Montana) has been hurt by a decline in the prices at which power produced by the units can be sold and by rising plant-generating costs. Please see Exhibit No. \_\_\_(RJR-12) for a copy of the report published by the Institute for Energy Economics and Financial Analysis. The Institute for Energy Economics and Financial Analysis report stated that “[t]hese factors combined to reduce PPL Montana’s pre-tax earnings (also called EBITDA – Earnings Before Interest Taxes Depreciation and Amortization) from Colstrip 1 and 2 by 50% just between 2010 and 2014.” Exhibit No. \_\_\_(RJR-12) at 7.

The Institute for Energy Economics and Financial Analysis report suggested that neither Talen Montana nor any subsequent merchant owner could “expect to obtain earnings either in the short-term or over the long term sufficient to cover operating expenses, debt, taxes, amortization of investments while providing a significant after-tax profit from Colstrip 1 and 2.” *Id*. at 17.

In July 2016, Talen Energy’s Senior Vice President and Chief Financial Officer Jeremy McGuire testified before the Montana State Energy and Telecommunication Interim Committee that it is not economically viable for an independent power producer to survive under the current circumstances due to the historically low natural gas prices and increasing environmental regulations. Please see Exhibit No. \_\_\_(RJR-13) for a copy of the testimony of Mr. McGuire before the Montana State Energy and Telecommunication Interim Committee.

Q. Has Talen Montana attempted to sell its interests in Colstrip Units 1 & 2?

A. Yes. Talen Montana has previously attempted to sell its Colstrip assets (which include a share of Colstrip Unit 3 as well as 50% of Colstrip Units 1 & 2) for several years. These efforts, however, have been unsuccessful. Indeed, NorthWestern, a prospective buyer, announced that the value of the entire package of PPL Montana’s Colstrip and hydro assets was worth less than the value of the hydro assets alone. *See* Exhibit No. \_\_\_(RJR-12) at 3.

### 4. Operational Considerations Related to Water Management With Respect to Colstrip Units 1 & 2

Q. Did PSE consider operational issues in deciding the future of Colstrip Units 1 & 2?

A. Yes. PSE considered operational issues in deciding the future of Colstrip Units 1 & 2. Specifically, water and wastewater management in response to the CCR rule and other regulations were important cost and operational considerations in determining the retirement of Colstrip Units 1 & 2.

A recent report by WorleyParsons commissioned by Talen Montana suggested that there are substantial benefits (both in cost and logistics) in retiring Colstrip Units 1 & 2 after 2020 as compared to before 2020. Please see Exhibit No. \_\_\_(RJR-14) for a copy of the WorleyParsons report. The WorleyParsons report describe the benefits as follows:

Capital cost lowers from FY2018 through FY2021 since procurement of required treatment equipment can begin further in advance of the shutdown date. Shutdown dates that occur further in the future require less storage of capture well water and allow for a smaller storage pond and smaller treatment equipment. Capital cost is at its minimum in FY2021, when procurement at least three years in advance of a shutdown date allows for the smallest storage pond and smallest treatment system. Storage pond size and treatment equipment capacity remains the same in the years following FY2021, so capital cost remains the same.

Operating cost lowers from FY2018 to FY2019 as remaining pond inventory is removed via forced evaporation and as CWBRS feed flow lowers (made possible by construction of the CWBRS more than one year in advance of the shutdown date). Operating cost increases if the shutdown occurs in FY2020 since forced evaporation of excess pond water may not be possible.

Exhibit No. \_\_\_(RJR-14) at 8-9.

Given the public statements by Talen Montana regarding its difficulty in earning a profit with Colstrip Units 1 & 2, PSE’s observation of Talen Energy’s declining stock position, and analysis of the overall energy market, PSE believed there was significant risk that Talen Montana would choose to shut down its operations at Colstrip Units 1 & 2. Should that have occurred, PSE would be left with a 50% share in Colstrip Units 1 & 2 and an absent partner. There would have been significant questions around PSE’s options in that scenario:

* Could PSE run Colstrip Units 1 & 2 at full capacity if Talen Montana had left?
* Would PSE need the additional power from Talen Montana’s 50% share of Colstrip Units 1 & 2 to serve load?
* If PSE were to continue to run Colstrip Units 1 & 2 at 50% capacity, would the cost of power generated from those units be uneconomic?
* What legal recourse, if any, would PSE seek against Talen Montana?

Finally, Chapter 80.80 RCW prohibits PSE from entering into a new long-term financial commitment for electric generation that does not meet certain greenhouse gas emission standards. Generation from Talen Montana’s 50% share of Colstrip Units 1 & 2 could not meet the greenhouse gas emission standards, so it would not be possible for PSE to use Talen Montana’s 50% share of Colstrip Units 1 & 2 to meet loads within Washington.

### 5. Current and Potential Environmental Regulations Applicable to Colstrip Units 1 & 2

Q. Did PSE consider current and potential environmental regulations in deciding the future of Colstrip Units 1 & 2?

A. Yes. In addition to the economic challenges facing Colstrip Units 1 & 2, there are also issues regarding the current and potential environmental regulations and laws.

The first regulation considered and modeled is the U.S. Environmental Protection Agency’s Regional Haze Program. This long-term program requires reduction of emissions to achieve a natural level of visibility by 2064. Emission controls required under the Regional Haze Program implemented through determination of Best Available Retrofit Technology (“BART”). Either the state makes a BART determination through a State Implementation Plan or Environmental Protection Agency makes a determination in a Federal Implementation Plan. Phase 1 of the Regional Haze Program was implemented in the past five years and focused on older plants, including Colstrip Units 1 & 2.

Q. What would the Regional Haze Rule likely require for Colstrip Units 1 & 2?

A. To comply with the Regional Haze Rule, Colstrip Units 1 & 2 would have had to make major upgrades to existing scrubbers for sulfur dioxide control and install controls for nitrogen oxides emissions. Although Talen Montana’s challenge of the Environmental Protection Agency’s Phase 1 BART determination was successful in the courts and remanded to the Environmental Protection Agency, the court remanded the determination based on a lack of justification. The Environmental Protection Agency must reissue a Federal Implementation Plan, which could contain more justification and more controls for BART.

Moreover, in the second phase of the Regional Haze Program, “reasonable progress” towards achieving natural visibility is required by 2028. To meet that schedule, which had plans initially due in 2018 (now an EPA-proposed delay for plans to 2021 is pending approval), additional sulfur dioxide and nitrogen oxides emission reductions from Colstrip Units 1 & 2 would likely be required.

Q. Was a BART analysis conducted to evaluate the cost-effectiveness of adding emissions controls at Colstrip Units 1 & 2 in response to the Regional Haze Rule?

A, Yes. PPL Montana (now Talen Montana) conducted a BART analysis to evaluate the cost-effectiveness of adding emissions controls at the Colstrip Steam Electric Generating Station in response to the Regional Haze Rule. The BART analysis considered retrofitting selective catalytic reduction systems to all four Colstrip units in order to reduce nitrogen oxides emissions. As part of the BART analysis, PPL Montana developed cost estimates for the retrofit technology using the EPA’s Integrated Planning Model. PPL Montana retained the services of Burns & McDonnell to prepare independent feasibility capital cost estimates for the retrofit of selective catalytic reduction technology on all four units at the Colstrip Steam Electric Generating Station. On February 7, 2012, Burns & McDonnell issued its feasibility capital cost estimate to comply with the Regional Haze Rule. Please see Exhibit No. \_\_\_(RJR-15) for a copy of the Burns & McDonnell feasibility capital cost estimate.

Q. What did this BART analysis conclude with respect to the Regional Haze Rule?

A. Preliminary calculations for compliance with further nitrogen oxides reductions was estimated to cost between $27 million for selective non-catalytic reductions to $165 million for selective catalytic reduction for Colstrip Units 1 & 2. Estimated capital investments to make further sulfur dioxide emissions reductions could range from $6 million for lime additions to the existing scrubbers to $56 million for an additional scrubber.

Given Talen Montana already had deemed Colstrip Units 1 & 2 to be in a precarious financial situation, PSE considered it unlikely that Talen Montana would be willing to bear the investment costs of the equipment upgrades. Additionally, Talen Montana determined that retirement of Colstrip Units 1 & 2 would further aid compliance with the second phase of the Regional Haze program for all four units of the Colstrip Steam Electric Generating Station. In other words, planned retirement of Colstrip Units 1 & 2 would likely avoid any future decision on BART compliance that would require additional investment at Colstrip Units 3 & 4.

Q. Did PSE consider current and potential environmental regulations other than the Regional Haze Rule in deciding the future of Colstrip Units 1 & 2?

A. Yes. In addition to the Regional Haze Rule, PSE considered the Environmental Protection Agency’s proposed Clean Power Plan in deciding the future of Colstrip Units 1 & 2. In a declaration submitted to the U.S. District Court for the District of Montana, Mr. Gordon Criswell, Talen Montana’s Director of Environmental and Engineering Compliance, described the challenges to Colstrip Units 1 & 2 in the face of the Clean Power Plan as follows:

Based on my calculations, EPA’s Clean Power Plan requires a 30 percent reduction in carbon dioxide emissions from Montana coal plants by 2022. Colstrip Units 1 and 2 make up 27 percent of carbon dioxide emissions from coal plants in Montana. Based on Talen [Montana]’s projections of likely compliance scenarios with the Clean Power Plan, a retirement of [Colstrip] Units 1 and 2 affords an easier path for [Colstrip] Units 3 and 4 to comply and continue operating. In analyzing the regulatory requirements, Talen [Montana] thus determined that retirement of [Colstrip] Units 1 and 2 would be a key mechanism for compliance with the Clean Power Plan.

*See* Exhibit No. \_\_\_(RJR-16) at 7. In short, the retirement of Colstrip Units 1 & 2 would satisfy the bulk of the emissions compliance reductions for Montana under the proposed Clean Power Plan, while providing a more certain future for Colstrip Units 3 & 4. Regardless of any pending litigation, PSE took these factors into account in evaluating the future of all four Colstrip units and the subsequent decision to retire Colstrip Units 1 & 2.

### 6. Terms and Conditions of the Coal Purchase and Sale Agreement

Q. Did PSE consider the terms and conditions of the Coal Purchase and Sale Agreement in deciding the future of Colstrip Units 1 & 2?

A. Yes. PSE factored the terms and conditions of the Coal Purchase and Sale Agreement in deciding the future of Colstrip Units 1 & 2. Section 3.1 of the Coal Purchase and Sale Agreement provides, in part, that coal delivery under such agreement shall continue until the first December 31 that falls on or after the expiration of thirty-six (36) months after the day that Talen Montana and PSE issue the Termination Notice, as defined and limited by subsection 3.2 of the Coal Purchase and Sale Agreement. Exhibit No. \_\_\_(RJR-6) at 18. Subsection 3.2 of the Coal Purchase and Sale Agreement allows Talen Montana and PSE to issue a Termination Notice to Western Energy Company at any time after the occurrence of both (a) and (b) below:

(a) All the coal is mined in Area D as shown in the initial General Mining Plan, and

(b) The prime stripping ratio on average in Areas A and B for coal to be delivered for the following year is projected to exceed 6.5:1 as evidenced by an Approved Annual Operating Plan (AOP).

Exhibit No. \_\_\_(RJR-6) at 18-19. The conditions in both subsections 3.2(a) and (b) have occurred. Therefore, PSE sees a path forward for terminating the Coal Purchase and Sale Agreement without penalty.

### 7. Legislative and Policy Considerations in Both Washington State and Montana

Q. Did PSE consider legislative and policy considerations in deciding the future of Colstrip Units 1 & 2?

A. Yes. PSE factored several legislative and policy considerations in both Washington State and Montana in deciding the future of Colstrip Units 1 & 2.

Q. What legislative and policy considerations for Washington State did PSE consider in deciding the future of Colstrip Units 1 & 2?

A. The State of Washington has a history of progressive policy in the environmental arena, including passage of such statutes as the Growth Management Act, the Energy Independence Act, the Emission Performance Standard, and the Model Toxics Control Act. Recently, Governor Inslee directed the Washington Department of Ecology to promulgate a Washington Clean Air rule to reduce greenhouse gas emissions in Washington State, and compliance begins in January 2017. At the polls in November 2016, Washington State voters were asked to consider an initiative proposing a carbon tax. Although the carbon tax initiative was not approved, similar proposals will likely be considered in the recently commenced 2017 legislative session, including an initial budget request by Governor Inslee that proposes to tax carbon.

Changes in policy create the potential for uncertainty. Some policies create long-lasting cost increases for customers even after the market adapts. For example, PSE estimates that a $25 per ton carbon tax would add more than $43 million dollars to electric generation costs in calendar year 2018, based on PSE’s 2016 generation profile. Please see Exhibit No. \_\_\_(RJR-17) for PSE’s projected impact of a carbon tax of $25 per ton on PSE’s cost of electric generation.

These potential additional costs change the economic profile of PSE’s resource choices and create risk and uncertainty. Taking into account an unpredictable policy landscape, especially around carbon pricing in Washington State, the decision to transition from the use of Colstrip Units 1 & 2 in a measured and thoughtful way provides a clearer pathway for reduced risk to PSE’s customers and reduction of carbon emissions without compromising reliability.

Q. What legislative and policy considerations for Montana did PSE consider in deciding the future of Colstrip Units 1 & 2?

A. The State of Montana has considerably different policy goals than the State of Washington. As a resource-dependent state, the focus of Montana’s recent policy actions around environmental and energy issues has been on employment and economic impact of measures to reduce greenhouse gas emissions. For instance, the Attorney General of Montana joined several other states in challenging the Clean Power Plan, arguing that the Clean Power Plan was crafted without state input and could cause economic harm.

Montana state legislators are similarly focused. Throughout the 2016 interim, state legislators crafted several bills that the Montana Legislature is likely to consider in the current legislative session, including proposals addressing the following items:

1. Appropriate funds to allow the State of Montana to intervene in this rate proceeding.

2. Establish requirements and a fee for submission, review, modification, and approval of a decommissioning and remediation plan for a coal-fired generating unit.

3. Appropriate money from an increased wholesale energy transaction tax fund to the Montana Department of Commerce to provide grants to entities (local governments, schools, etc.) impacted by the closure of a Montana located coal plant.

4. Require an electrical company, wholesale exempt generator, or a public utility that retires a coal-fired generating unit to pay a coal-county impact fee for ten years following closure of the unit or units. The money is provided to entities (local governments, schools, etc.) impacted by the closure of a unit.

5. Establish a benefits and retirement security task force in the Montana Governor’s Office.

6. Establish liability requirements for owners of coal-fired generation.

PSE expects more bills to be introduced during the Montana legislative session creating greater uncertainty around the estimated costs and viability of Colstrip Units 1 & 2.

## D. The Decision to Settle Litigation and Retire Colstrip Units 1 & 2

Q. What legislative and policy considerations for Montana did PSE consider in deciding the future of Colstrip Units 1 & 2?

A. Given the factors considered by PSE regarding the future of Colstrip Units 1 & 2 previously discussed (including the environmental regulatory benefits potentially derived by Colstrip Units 3 & 4 through retirement of Colstrip Units 1 & 2), PSE concluded (in consultation with Talen Montana) that the best course was to determine a planned retirement date for Colstrip Units 1 & 2. The existing litigation was not a primary factor in the decision to retire Colstrip Units 1 & 2. Through a planned retirement, PSE and Talen Montana could avoid future investment in environmental equipment upgrades on Colstrip Units 1 & 2 while ensuring that Colstrip Units 3 & 4 would continue to run into the future. PSE and Talen Montana agreed that a retirement date in 2022 could achieve these objectives.

Once PSE and Talen Montana had reached this conclusion, it was possible to agree to a retirement date of July 1, 2022, with Sierra Club and Montana Environmental Information Center to settle the Clean Air Act litigation. Beginning in April 2016, the parties filed a joint motion to stay the case to engage in settlement discussions. The parties reached agreement in July 2016 and filed a consent decree with the court. The court approved the consent decree on September 6, 2016. Please see Exhibit No. \_\_\_(RJR-18) for a copy of the consent decree approved by the court to dismiss the Sierra Club and Montana Environmental Information Center lawsuit.

Q. Does the consent decree require the retirement of the boilers of the Colstrip Steam Electric Generating Station?

A. Yes. The consent decree to dismiss the Sierra Club and Montana Environmental Information Center lawsuit requires the retirement of the boilers at Colstrip Units 1 & 2 by July 1, 2022. *See* Exhibit No. \_\_\_(RJR-18) at 6-7. The consent decree also sets interim emissions limits for Colstrip Units 1 & 2 nitrogen oxide and sulfur dioxide that are no more stringent than the current emissions rates from those units. *See id.* at7. This consent decree is binding on any future owner of Colstrip Units 1 & 2.

Q. Does the consent decree provide benefits to PSE and the other owners of the Colstrip Steam Electric Generating Station?

A. Yes. The consent decree provides a broad array of benefits to PSE and the other owners of the Colstrip Steam Electric Generating Station. For instance, the consent decree places no requirements or restrictions on Colstrip Units 3 & 4, and Sierra Club and Montana Environmental Information Center have agreed to release their claims against Colstrip Units 3 & 4 relating to any projects undertaken prior to the date of the consent decree.

For Colstrip Units 1 & 2, Sierra Club and Montana Environmental Information Center agreed to a broad release of claims, including a release of all environmental claims, under any statute or common law, related to both past and future operation. *See* Exhibit No. \_\_\_(RJR-18) at 10-12. However, claims related to future operations are not released if such operations cause an unexpected and unintended sudden release of contaminants to the environment which poses a significant threat to human health or the environment.

The consent decree also restricts the plaintiffs in the matter from filing additional litigation to force retirement of Colstrip Units 1 & 2 prior to July 1, 2022, the settlement date in 2022. *See* Exhibit No. \_\_\_(RJR-18) at 9. With some limitations, the consent decree retained the right of PSE and Talen Montana to use equipment at Colstrip Units 1 & 2 other than the boilers to support the operation of Colstrip Units 3 & 4. *See id.* at12.

Subject to certain limitations, the consent decree permits the installation of a new auxiliary/heating boiler at the Colstrip Steam Electric Generating Station. *See* Exhibit No. \_\_\_(RJR-18) at 12. Plaintiffs also agreed in the consent decree to limit advocacy efforts against the Colstrip Steam Electric Generating Station in several ways, including, for example, efforts related to Colstrip Units 1 & 2 regarding Regional Haze and the Clean Power Plan. *See id.* at13. Finally, the consent decree does not require the payment of any penalties. *See id.* at18.

Q. Did the parties reach a settlement with respect to the action brought by Montana Environmental Information Center and Earthjustice that alleged violations of the Agreed Order on Consent Regarding Impacts Related to Wastewater Facilities?

A. Yes. In 2016, the parties reach a settlement with respect to the action brought by Montana Environmental Information Center and Earthjustice that alleged violations of the Agreed Order on Consent Regarding Impacts Related to Wastewater Facilities. Specifically, the parties reached a settlement regarding the petition for review based on (i) the proposed retirement of the boilers of Colstrip Units 1 & 2 by July 1, 2022, and (ii) a commitment to transition to the use of a non-liquid disposal system for CCR material from the Colstrip Unit 3 & 4 scrubbers by July 1, 2022. Please see Exhibit No. \_\_\_(RJR-19) for a copy of the settlement agreement associated with the Montana Environmental Information Center and Earthjustice lawsuit.

Q. Why did PSE choose to settle the litigation rather than proceed to trial?

A. The decision to retire Colstrip Units 1 & 2 was a decision made by by PSE and Talen Montana, and that decision was based on the factors described above. Once PSE and Talen Montana had decided to retire Colstrip Units 1 & 2, all owners of all four units of the Colstrip Steam Electric Generating Station were able to avoid further litigation costs, obtain releases related to all four units, and obtain significant other concessions from Sierra Club and Montana Environmental Information Center that will assist with the continued operation of Colstrip Units 3 & 4. These objectives were achieved without agreeing to any additional requirements that would impact operations. Additionally, PSE would be able to avoid operational costs associated with all four Colstrip units.

Q. Did the settlement provide additional costs savings to PSE?

A. Yes. The settlement also provided PSE the opportunity to forego investments that may have been required in the future for equipment to meet environmental compliance. PSE estimated the costs of SCR equipment to be well over $100 million for Colstrip Units 1 & 2 and even more for Colstrip Units 3 & 4. *See* Exhibit No. \_\_\_(RJR-15).

Q. Did PSE have other factors in its decision to enter into the settlement?

A. Yes. PSE considered other factors in its decision to enter into the settlement, including the age and depreciation of Colstrip Units 1 & 2. As previously noted, Colstrip Units 1 & 2 are now over 40 years old. Please see the Prefiled Direct Testimony of John Spanos, Exhibit No. \_\_\_(JJS-1T), and the supporting exhibits thereto, for updated depreciation schedules for Colstrip Units 1 & 2 and other PSE assets.

PSE also considered the intergenerational equity issues associated with past, present, and future investments at Colstrip Units 1 & 2, and the ratemaking and financing mechanisms available to address those issues. Please see the Prefiled Direct Testimony of Daniel A. Doyle, Exhibit No. \_\_\_(DAD-1T), and the Prefiled Direct Testimony of Katherine J. Barnard, Exhibit No. \_\_\_(KJB-1T), for a discussion of the ratemaking and financing mechanisms considered by PSE to address the intergenerational equity issues.

In short, PSE’s goal was to balance the past investments in the Colstrip Steam Electric Generating Station made by customers without incurring additional future investment that would not be equal to a potential benefit. Thus, PSE was willing to agree with Talen Montana on a retirement date for Colstrip Units 1 & 2 that reflected factors such as economics and environmental regulation, and to ensure Colstrip Units 3 & 4, which are newer, cleaner, and more economic, could operate longer.

Q. Please outline any factors that may prompt a retirement of Colstrip Units 1 & 2 prior to July 1, 2022.

A. PSE plans for the operation of Colstrip Units 1 & 2 until July 1, 2022. However, forces not under PSE’s control may cause the retirement of Colstrip Units 1 & 2 prior to July 1, 2022. Such forces could include actions taken by Talen Montana, significant operational failures, environmental issues or new requirements, and changes in the economics of the units.

If Talen Montana were to decide to cease operations of Colstrip Units 1 & 2 prior to July 1, 2022, PSE believes that it would neither be in the best economic interest of its customers nor legally possible for PSE to either assume the role of plant operator of Colstrip Units 1 & 2 or assume the Talen Montana’s share of the output of Colstrip Units 1 & 2. As previously noted, Riverstone Holdings LLC acquired Talen Montana on December 6, 2016. Prior to the merger and acquisition, Talen Montana was unable to communicate fully with PSE due to the pending merger discussions, which affected the ability of either parties to make any significant decisions as to the future of Colstrip Units 1 & 2. Prior to the time that Talen Montana was unable to communicate with PSE, Talen Montana had publically indicated an economic need and desire to close Colstrip Units 1 & 2 as quickly as possible. Currently, PSE is establishing a new relationship with new management to ensure PSE’s goals for responsible retirement of the facility remain front and center.

Colstrip Units 1 & 2 will be run as safely and efficiently as possible until the retirement date. As with any piece of machinery, however, there can be unexpected breakdowns. Should a breakdown of a unit occur, PSE and Talen Montana would evaluate the costs and benefits of repairing and returning the unit to operation, but a planned retirement date of no later than July 1, 2022, would undoubtedly alter the cost-benefit analysis associated with such a decision.

Like PSE’s other units, Colstrip Units 1 & 2 dispatch electricity when it is cost effective for customers. As always, PSE will procure electricity to meet load at the lowest reasonable cost, which can impact Colstrip Units 1 & 2. For instance, the Colstrip Units 1 & 2 could be taken offline during a heavy spring hydro run off. As the retirement date approaches, PSE will continue to evaluate Colstrip Units 1 & 2 holistically versus market prices.

PSE will continue to evaluate any new laws and environmental regulations against the economic benefit of continually running Colstrip Units 1 & 2. With new leadership at the federal level, there is considerable uncertainty about the direction of environmental regulation. Nonetheless, PSE will stay compliant with all laws and regulations. One area of risk PSE is closely monitoring is potential action by the Montana State Legislature. Certain proposals currently before the body (described above) could have considerable negative costs impacts to Colstrip Units 1 & 2. The impact of some of those provisions becoming law may ultimately influence how cost-effective it is to continue to run the units. For instance, a proposed measure that seeks to double the wholesale energy tax and use the funding for coal community mitigation could potentially make Colstrip Units 1 & 2 uneconomic versus other sources. PSE will work with the State of Montana as they deliberate on legislation and update the Commission through this general rate case proceeding.

## E. Colstrip Units 1 & 2 Decommissioning Requirements and Considerations

Q. What are the current legal obligations for decommissioning Colstrip Units 1 & 2?

A. PSE interprets the term “decommissioning” generally as the estimate of costs to suspend operations, and remove some or all the above grade structures associated with Colstrip Units 1 & 2, followed by reasonable restoration in these areas. As with remediation described further below, this will require estimates that may be expressed in ranges of costs according to different projections of potential decommissioning scenarios.

There are currently no specific legislative, regulatory, permit or contractual requirements to decommission any above ground plant structures for Colstrip Units 1 & 2. However, going forward there is the potential for legislation in the State of Montana that could change this legal requirement. In late 2016, the Montana Joint Energy Committee drafted legislation to require a decommissioning and remediation plan be filed with the Montana State Department of Environmental Quality. The proposed legislation would require the Montana State Department of Environmental Quality to consider and approve or deny any final plan for decommissioning in addition to assessing penalties for non-compliance. At this time, the specifics of the requirements that may be included in legislation are undetermined.

Given current requirements or lack thereof, a minimum decommissioning scenario would be to simply isolate Colstrip Units 1 & 2 from Colstrip Units 3 & 4 by installing security measures and procedures to prevent access or interference. The highest cost scenario would be full demolition of above and below ground structures and returning the site to greenfield conditions. All estimates assume scrap value will be accrued to the demolition company and the estimated cost reflects that value. Additionally, the contractor would hire the necessary labor to perform the on-site work.

Q. What does PSE project will be PSE’s share of decommissioning and demolition costs for Colstrip Units 1 & 2?

A. PSE projects that its share of decommissioning and demolition costs for Colstrip Units 1 & 2 will be $4.2 million in 2016 dollars. PSE relied upon decommissioning and demolition cost estimates from the following three entities to arrive at this cost estimate: (i) Black & Veatch Corporation (“Black & Veatch”); (ii) HDR Engineering, Inc. (“HDR Engineering”); and (iii) Brandenburg Industrial Service Company (“Brandenburg”).

Q. Please describe the decommissioning and demolition costs projected by Black & Veatch for Colstrip Units 1 & 2.

A. To address the potential decommissioning and demolition cost scenarios for Colstrip Units 1 & 2, PSE commissioned Black & Veatch in 2013 to perform an “order of magnitude” cost estimate for decommissioning and demolition of Colstrip Units 1 & 2. The Black & Veatch study utilized the engineering firm’s proprietary estimating tool developed for other coal fired steam generating station decommissioning and demolition studies. Black & Veatch solely used paper documents to determine plant specifications and conducted no site visit. On January 15, 2014, Black & Veatch issued its study to PSE. Please see Exhibit No. \_\_\_(RJR-20) for a copy of the Black & Veatch study.[[3]](#footnote-4)

The Black & Veatch study projected costs of approximately $81,000/MW for the decommissioning and demolition of Colstrip Units 1 & 2. See Exhibit No. \_\_\_(RJR-20) at 5. (All costs for the Black & Veatch study are in 2014 dollars.) Each unit has a gross capacity of 307 MW. Thus, the Black & Veatch study projected decommissioning and demolition cost of (i) approximately $24,867,000 per unit and (ii) approximately $49,734,000 for both Colstrip Units 1 & 2. PSE’s share is 50% of these projected costs, for a total projected cost to PSE of $24,867,000.

Q. Please describe the decommissioning and demolition costs projected by HDR Engineering for Colstrip Units 1 & 2.

A. In 2016, PSE sought additional analysis around the potential decommissioning and demolition costs of Colstrip Units 1 & 2 and commissioned HDR Engineering, an engineering firm with expertise in demolition, to perform an updated decommissioning and demolition cost study. Whereas PSE permitted Black & Veatch to prepare its estimate solely on paper documentation, PSE permitted HDR Engineering to base its estimate on plant drawings and a site visit. The HDR Engineering study is a Class IV level feasibility study, with cost estimates at +/- 30-50%. All costs for the HDR Engineering costs (i) are in 2016 dollars, (ii) assume demolition to 3 feet below grade for slabs and foundations, and (iii) do not include costs to handle or remediate impacts from CCRs.

PSE requested that HDR Engineering provide cost estimates for the following three scenarios, generally described as follows:

**Option A:** Colstrip Units 1 through 4 are shut down and there are no operating facilities that need to remain or be protected that would restrict demolition means and methods. All environmental concerns such as asbestos, universal waste, plant chemicals, PCB oil and lube oils will be removed from Colstrip Units 1 & 2 and properly disposed offsite.

**Option B:** Colstrip Units 3 & 4 remain operational while the complete demolition of Colstrip Units 1 & 2 occurs. Demolition means and methods will be modified to protect the Auxiliary building and all operations that are to remain. In this option, all asbestos, universal waste and PCB oil associated with Colstrip Units 1 & 2 will be removed and disposed offsite and all plant chemicals and lube oil will be transferred to Colstrip Units 3 & 4 for re-use.

**Option C:** In this option all asbestos, universal waste and PCB oil associated with Colstrip Units 1 & 2 will be removed and disposed offsite. All plant chemicals and lube oils will be transferred to Colstrip Units 3 & 4 for reuse, and the plant will be idled in place. Once this is completed, Colstrip Units 1 & 2 will remain in a cold, dark and dry condition until Colstrip Units 3 & 4 are shut down. At that time all four units will be demolished simultaneously.

On November 4, 2016, HDR Engineering issued its study to PSE. Please see Exhibit No. \_\_\_(RJR-21) for a copy of the HDR Engineering study.

The HDR Engineering study projected the following decommissioning and demolition costs for the three scenarios requested:

**Option A:** The HDR Engineering study projected decommissioning and demolition costs of $8,158,790 for Colstrip Units 1 & 2 when all four units are shut down and there are no operating facilities that need to remain or be protected that would restrict demolition means and methods.

**Option B:** The HDR Engineering study projected decommissioning and demolition costs of $14,147,728 for Colstrip Units 1 & 2 when Colstrip Units 3 & 4 remain operational while the complete demolition of Colstrip Units 1 & 2 occurs.

**Option C:** The HDR Engineering study projected decommissioning and demolition costs of $293,353 for Colstrip Units 1 & 2 when Colstrip Units 1 & 2 will remain in a cold, dark and dry condition until Colstrip Units 3 & 4 are shut down.

See Exhibit No. \_\_\_(RJR-21) at 3.

Q. Please describe the decommissioning and demolition costs projected by Brandenburg for Colstrip Units 1 & 2.

A. Also in 2016, PSE engaged Brandenburg—the demolition firm that performed the demolition work for Talen Montana at its recently-retired Corrette Coal-Fired Generating Station located in Billings, Montana—to provide a high-level decommissioning and demolition cost estimate based solely on paper records, plant drawings, and without a site visit. On November 3, 2016, Brandenburg issued its study to PSE. Please see Exhibit No. \_\_\_(RJR-22) for a copy of the Brandenburg study. (All costs in the Brandenburg study are presented in 2016 dollars.) The Brandenburg study projected the decommissioning and demolition costs of $7,548,840 for Colstrip Units 1 & 2. *See* Exhibit No. \_\_\_(RJR-22) at 4.

Q. How did PSE arrive at its projected share of decommissioning and demolition costs for Colstrip Units 1 & 2 of $4.2 million in 2016 dollars?

A. PSE relied on the HDR Engineering report in determining its projected share of decommissioning and demolition costs for Colstrip Units 1 & 2 of $4.2 million in 2016 dollars. Specifically, PSE relied upon a combination of Option A and Option C presented in the HDR Engineering report. The sum of these two options is $8,452,143 in 2016 dollars (i.e., the sum of the projected cost of Option A ($8,158,790) and the projected cost of Option C ($293,353)). (Please note that all costs in the HDR Engineering report are presented in 2016 dollars.) As an owner of an undivided 50% interest in Colstrip Units 1 & 2, PSE’s projected share of decommissioning and demolition costs for Colstrip Units 1 & 2 is $4.2 million in 2016 dollars. Please see Exhibit No. \_\_\_(RJR-23) at page 1, column B, for a schedule of the total projected decommissioning and demolition costs (in 2016 dollars) for Colstrip Units 1 & 2 and at page 2, column B, for PSE’s share thereof.

Q. What is PSE’s projected share of decommissioning and demolition costs for Colstrip Units 1 & 2 in real dollars?

A. As previously mentioned, PSE projects that its share of decommissioning and demolition costs for Colstrip Units 1 & 2 is $4.2 million in 2016 dollars (i.e., nominal dollars). PSE would not actually incur these expenses until 2023 and 2035 for the work to be performed for Option C and Option A, respectively. Therefore, to calculate the projected costs that PSE would actually incur in each of these years, PSE has adjusted the dollars by an average annual inflation rate of 2.50%. This adjustment results in a projected PSE share of decommissioning and demolition costs for Colstrip Units 1 & 2 of $6.7 million in real dollars. Please see Exhibit No. \_\_\_(RJR-23) at page 1, column C, for a schedule of the total projected decommissioning and demolition costs (in real dollars) for Colstrip Units 1 & 2 and at page 2, column C, for PSE’s share thereof.

Q. Why did PSE rely upon both Option A and Option C from the HDR Engineering report in determining the projected decommissioning and demolition costs of Colstrip Units 1 & 2?

A. PSE relied upon both Option A and Option C from the HDR Engineering report in determining the projected decommissioning and demolition costs of Colstrip Units 1 & 2 because the combination of these options minimized costs while providing for the eventual demolition of Colstrip Units 1 & 2. As demonstrated by the cost differential between Option A and Option B from the HDR Engineering report, there are significant cost advantages of decommissioning and demolition of Colstrip Units 1 & 2 at the same time as the decommissioning and demolition of Colstrip Units 3 & 4. Therefore, PSE assumed the following:

(i) PSE and Talen Montana would incur the costs projected in Option C in 2023 to place Colstrip Units 1 & 2 in a cold, dark and dry condition until Colstrip Units 3 & 4 are shut down; and

(ii) PSE and Talen Montana would incur the costs projected in Option A in 2035 for the decommissioning and demolition of Colstrip Units 1 & 2 at the same time as the decommissioning and demolition of Colstrip Units 3 & 4.

Q. Why did PSE assume the demolition of all four units of the Colstrip Steam Electric Generating Station in 2035?

A. Whereas Colstrip Units 1 & 2 now have a planned retirement date of July 1, 2022, Colstrip Units 3 & 4 do not have any planned date for retirement. The depreciation schedules presented in the Prefiled Direct Testimony of John Spanos, Exhibit No. \_\_\_(JJS-1T), and supporting exhibits thereto, suggest a depreciable life for Colstrip Units 3 & 4 through 2035. Therefore, PSE assumed, for purposes of analysis only, that (i) Colstrip Units 3 & 4 would be retired in 2035 and (ii) all four units of the Colstrip Steam Electric Generating Station would be simultaneously decommissioned and demolished at that time.

## F. Plan for the Development, Operation, and Closure of the Water and Waste Management Features at Colstrip Units 1 & 2

Q. Please describe the CCRs produced by electric generation operations at Colstrip Units 1 & 2.

A. Electricity generation operations at the Colstrip Units 1 & 2 produce two CCRs: (i) scrubber slurry, which includes the fly ash and flue gas desulfurization solids from the air pollution control system; and (ii) bottom ash, which is collected at the bottom of the boilers. For CCRs generated at Colstrip Units 1 & 2, the scrubber slurry is transferred as a slurry through pipes to either the Stage-Two Evaporation Pond area, where it is treated and dewatered (the resulting material is commonly referred to as paste) and then disposed. Bottom ash that is generated at Colstrip Units 1 & 2 is dewatered in bottom ash ponds at the plant area, and then transported via truck to the the Effluent Holding Pond area for disposal. The ponds at the Colstrip Steam Electric Generating Station also store and treat water that is used in plant operations. Because the Colstrip Steam Electric Generating Station is a “zero discharge” operation, the storage and evaporation functions of the ponds are critical to operations at the facility.

Q. Has Talen Montana developed a plan for the development, operation, and closure of the water and waste management features at the Colstrip Steam Electric Generating Station?

A. Yes. Talen Montana commissioned Geosyntec Consultants (“Geosyntec”) to develop a plan for the development, operation, and closure of the water and waste management features at the Colstrip Steam Electric Generating Station. The need for the plan arose from new requirements for management of the CCRs that are generated at the site. On September 23, 2016, Geosyntec issued the most current version of the plan. Please see Exhibit No. \_\_\_(RJR-24) for a copy of the most current version of the plan issued by Geosyntec.

Q. What is the status and current use of the CCR impoundments for Colstrip Units 1 & 2?

A. The status and current use of CCR impoundments for Colstrip Units 1 & 2 are as follows:

|  |
| --- |
| **Plant Area Units** |
| Units 1 & 2 Fly A Pond | Full with CCRs prior to the effective date of the CCR Rule and no longer receives CCRs nor impounds water.  |
| Units 1 & 2 B Pond | Contains a significant amount of CCRs and is currently in use for CCR disposal, as needed. |
| Units 1 & 2 Bottom Ash Pond  | Contains a significant amount of bottom ash and water and is currently in use for bottom ash dewatering. |
| **Colstrip Units 1 & 2 Stage II Evaporation Pond** |
| A Cell | Full with CCRs prior to effective date of the CCR Rule and no longer receives CCRs nor impounds water. |
| B Cell (Clearwater Cell) | Used for water storage and is the current location of return water to the plant. |
| C Cell | Not yet constructed. |
| Old Clearwell | Contains CCRs and water and is currently in use. |
| D Cell | Currently used for water storage. |
| E Cell | Contains significant amounts of both paste/water and is currently in use. |

*See* Exhibit No. \_\_\_(RJR-24) at 4-5.

Q. What approach was used to develop the plan for the development, operation, and closure of the water and waste management features at the Colstrip Steam Electric Generating Station?

A. The plan was generally developed by: (i) identifying relevant compliance parameters; (ii) identifying relevant site operating parameters; (iii) collecting data needed to perform the planning analyses and performing water balance analyses; (iv) analyzing current and future disposal capacities for water and waste under several potential future site development scenarios; and (v) estimating the cost for various candidate master plan approaches. Then, after incorporating input from Talen Montana, an overall approach for future development of the CCR units at the Colstrip Steam Electric Generating Station was developed. Please see Exhibit No. \_\_\_(RJR-24) at 5-8 for further detail regarding the approach used in the development of the plan.

Q. Please describe the construction and design activities contained in the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2.

A. The plan contains the construction and design activities described in Table 2 below for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2.

**Table 2. Colstrip Units 1 & 2 Plan Construction and Design Activities**

|  |  |  |
| --- | --- | --- |
| **Year** | **Construction andDesign Activity** | **Costs(in 2016 dollars)** |
| 2016 | Design/Begin Construction Bottom Ash Dewatering System & new Scrubber Makeup Water Pond, Design/Construct Water Management System. | $4,400,000 |
| 2018 | Design A Pond Closure | $150,000 |
| 2019 | Design Capture Well Treatment System | $200,000 |
| Close A Pond | $2,500,000 |
| Design STEP A Cell closure  | $300,000 |
| 2020 | Close Step A Cell | $8,600,000 |
| Design Capture Well Storage Pond | $150,000 |
| Design/Construct Capture Well Treatment System | $6,460,000 |
| 2021 | Construct Capture Well Storage Pond | $1,710,000 |
| Construct Capture Well Treatment System | $10,336,000 |
| Design STEP Old Clearwell closure | $300,000 |
| Design STEP E Cell closure | $300,000 |
| Design Bottom Ash Pond closure | $300,000 |
| 2022 | Close STEP Old Clearwell | $2,300,000 |
| Close STEP E Cell | $9,500,000 |
| Complete construction of Capture Well Treatment System | $9,044,000 |
| Close bottom ash ponds and clearwell | $1,700,000 |
| Design STEP D Cell closure | $300,000 |
| Design B Pond Closure at plant area | $150,000 |
| 2023 | Close STEP D Cell | $5,300,000 |
| Close B Pond | $2,800,000 |
| Prepare STEP B Cell for use as post-closure stormwater management pond | $500,000 |

*See* Exhibit No. \_\_\_(RJR-24) at 12-14.

Q. Please describe the operations and maintenance activities contained in the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2.

A. The plan contains the following operations and maintenance activities for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2: (i) groundwater monitoring, (ii) forced evaporation; (iii) wastewater treatment; (iv) post-closure care; and (v) landfill dry disposal. The operations and maintenance activities identified in the plan commence in 2016 and continue through 2051. Projected operations and maintenance activity costs (in 2016 dollars) range from a low of $460,000 (in 2016) to a high of $4,218,292 (in each of 2024, 2025, and 2026). *See* Exhibit No. \_\_\_(RJR-24) at 12-14.

Q. What does PSE project will be PSE’s share of the costs of the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2?

A. The sum of the projected costs of (i) the construction and design activities and (ii) operations and maintenance activities associated with the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2 is $149,987,908 in 2016 dollars. (Please note that all amounts in the plan are presented in 2016 dollars.) As a an owner of an undivided 50% interest in Colstrip Units 1 & 2, PSE’s projected share of the costs of the plan is approximately $75 million in 2016 dollars. Please see Exhibit No. \_\_\_(RJR-23) at page 1, column D, for a schedule of the total costs of the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2 (in 2016 dollars) for Colstrip Units 1 & 2 and at page 2, column D, for PSE’s share thereof.

Q. What is the PSE’s projected share of the costs of the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2 in real dollars?

A. As previously mentioned, PSE projects that its share of the costs of the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2 is approximately $75 million in 2016 dollars (i.e., nominal dollars). PSE would incur these expenses for the period beginning 2016 and ending in 2051. Therefore, to calculate the projected costs that PSE would actually incur in each of these years, PSE has adjusted the dollars by an average annual inflation rate of 2.50%. This adjustment results in a projected PSE share of the costs of the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2 of approximately $103 million in real dollars. Please see Exhibit No. \_\_\_(RJR-23) at page 1, column E, for a schedule of the total costs of the plan for the development, operation, and closure of the water and waste management features at Colstrip Units 1 & 2 (in real dollars) and at page 2, column E, PSE’s share thereof.

## G. Replacement Power

Q. How will PSE determine which resources will be used to replace the generation currently produced by Colstrip Units 1 & 2 post-retirement?

A. PSE will use its existing processes and tools to determine future resources including the Integrated Resource Planning, load forecasting, and Request for Proposal processes. The retirement of the boilers of Colstrip Units 1 & 2 does not require PSE to take immediate action to replace the resulting lost energy or capacity. Now that a retirement date is known, PSE can plan for the resulting loss of energy and capacity in its ongoing Integrated Resource Planning processes. PSE’s 2017 Integrated Resource Plan will take into account the most recent load forecast along with retirement of Colstrip Units 1 & 2 boilers to determine the need for resources.

Q. When does PSE plan to release its 2017 Integrated Resource Plan?

A. PSE plans to release a draft version of the 2017 Integrated Resource Plan in April 2017 and file a final version of the 2017 Integrated Resource Plan with the Commission in July 2017. Assuming both (i) the filing of a final version of the 2017 Integrated Resource Plan with the Commission in July 2017 and (ii) the 2017 Integrated Resource Plan projects a need for resources, PSE would issue an all-source request for proposals (in accordance with WAC 480-407-015) to determine the appropriate resource (or mix of resources) that most cost-effectively meets PSE’s projected need.

# III. RATE YEAR PRODUCTION OPERATIONS AND MAINTENANCE EXPENSE

## A. Overview of Rate Year Production Operations and Maintenance Expense

**Q How has PSE prepared its rate year production operations and maintenance expense for the rate year?**

A. PSE developed the rate year production O&M expense in accordance with the Final Order in Docket UE-141141. (“2014 PCORC”). For most plants, PSE utilizes test year O&M expense and makes certain pro forma adjustments as allowed by the Commission.

**Q. What is the basis for rate year production O&M if not test year expense?**

A. Rate year O&M expenses for PSE’s jointly-owned facilities, (Colstrip Units 1 & 2, Colstrip Units 3 & 4 and the Frederickson 1 Generating Station (“Freddy 1”), are developed from budgets and business plans provided by the plant operator and approved by the owners. For PSE’s hydroelectric plants, rate year O&M expense undertaken to comply with FERC license requirements is based on scheduled rate year activity required under the terms of the FERC licenses. PSE’s wind generating stations’ rate year royalties, rents and contract maintenance expense are pro formed to reflect rate year projected wind generation. This is consistent with the methodology used to determine rate year O&M expenses that was approved by the Commission in the last several rate cases.

**Q. What is PSE’s production O&M expense for the rate year?**

A. The rate year production O&M costs included in this filing are $147.0 million, an increase of $13.9 million as compared to the 2014 PCORC production O&M costs of $133.1 million. Please see Exhibit No. \_\_\_(RJR-25) for a summary of the rate year production O&M costs.

**Q. Please describe the nature of the pro forma adjustments made to production O&M costs in this filing.**

A. The test year for this proceeding is October 1, 2015, through September 30, 2016, and the rate year is January 1, 2018, through December 31, 2018. PSE has made certain adjustments to test year expenses for rate year production O&M expense, as follows:

(i) increased test year production O&M to reflect $3.0 million projected increase in Colstrip non overhaul-related O&M and $3.1 million for amortization of Colstrip overhaul costs as discussed in more detail below;

(ii) added $3.3 million to test year O&M to reflect rate year amortization of major maintenance of combustion turbine and combined cycle facilities as detailed in the “Major Maintenance” tab of the workpapers entitled RJR-UP (C) Production O&M 2017 GRC and as discussed below;

(iii) added $2.7 million to test year wind production O&M expense to reflect projected rate year contract maintenance costs under the Vestas and Siemens maintenance contracts as well as rent and royalty payments for the Hopkins Ridge, Wild Horse/Wild Horse Expansion and Lower Snake River Phase 1 Wind Generating Stations based upon forecasted rate year wind generation;

(iv) added $0.6 million to test year O&M to reflect higher scheduled rate year FERC licensing costs associated with the Baker River and the Snoqualmie Falls Hydroelectric Projects.

(v) added $██ million to test year production O&M to reflect Freddy 1 budgeted test year O&M, per the plant operator;

 (vi) added $██ million to test year O&M to reflect a performance bonus under the contractual service agreement with General Electric International (“GE International”).

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## B. Operations and Maintenance Expense of PSE’s Coal Generation Facilities

**Q. What are the sources of O&M costs for the Colstrip Generating Station?**

A. The O&M costs for both of PSE’s jointly-owned Colstrip units, are developed from budgets and business plans provided by the plant operator and approved by owners. Colstrip fuel costs are developed from annual operating plans prepared by the coal supplier, Western Energy Company. The Commission has approved this practice for determining rate year power costs in the past several general rate case and power cost only rate case proceedings.

With respect to Colstrip overhaul costs, the 2017 GRC Production O&M reflects the methodology as outlined in the Settlement Stipulation approved in PSE’s 2014 PCORC.[[4]](#footnote-5) Accordingly, the January-December 2018 rate year includes amortization associated with Colstrip Unit 2 actual overhaul costs incurred in 2015 and actual overhaul costs for Colstrip Units 1 & 4 incurred in 2016 as well as the overhaul costs for Colstrip Units 2 & 3 (excluding management reserves) as projected in the plant operator’s 2017 or 2018 budget, all amortized over a 36-month period. Amounts included in this filing for amortization associated with the 2017 Colstrip Unit 1 overhaul will be adjusted once actual costs are known and measurable.

**Q. What Colstrip overhaul events did PSE include in the rate year?**

A. The calculation of rate year amortization related to Colstrip overhaul events is summarized in Table 3 below:

**Table 3. Colstrip Overhaul Events Amortization**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Event** | **EventDate** | **Amt. toAmort.** | **Amort.Period** | **MonthlyAmort.** | **Amort.Begin** | **Amort.End** | **RateYear** |
| Colstrip Unit #1 Outage | 5/6/16 | XXXXXX | 36 | XXXXXX | 6/1/16 | 5/31/19 | XXXXXX |
| Colstrip Unit #1 Outage (a) | 4/30/17 | XXXXXX | 36 | XXXXXX | 5/1/17 | 4/30/20 | XXXXXX |
| Colstrip Unit #2 Outage | 6/30/15 | XXXXXX | 36 | XXXXXX | 7/1/15 | 6/30/18 | XXXXXX |
| Colstrip Unit #2 Outage | 6/30/18 | XXXXXX | 36 | XXXXXX | 7/1/18 | 6/30/21 | XXXXXX |
| Colstrip Unit #3 Outage | 6/30/14 | XXXXXX | 36 | XXXXXX | 7/1/14 | 6/30/17 | XXXXXX |
| Colstrip Unit #3 Outage | 6/30/17 | XXXXXX | 36 | XXXXXX | 7/1/17 | 6/30/20 | XXXXXX |
| Colstrip Unit #4 Outage | 6/30/16 | XXXXXX | 36 | XXXXXX | 7/1/16 | 6/30/19 | XXXXXX |
| (a) Due to uncertainties in 2016 associated with pending New Source Review (NSR) litigation, the scope of the 2016 major maintenance event was reduced, and a portion of the work was deferred into 2017. |

**Q. What was the amount of non-overhaul related Colstrip O&M included in the rate year?**

A. Non-overhaul related Colstrip O&M included in the operator budget for the rate year amounts to $39.1 million. This compares with $35.8 million for the 2014 PCORC rate year and $36.1 million in the test year. These amounts do not include any provision for management reserve.

**Q. Did PSE include Colstrip major overhauls and other outages that will occur in the rate year in the preparation of the power costs?**

A. Yes. Colstrip overhauls and other outages are inputs to the AURORA model and are used in determining rate year power costs, which are discussed in the Prefiled Direct Testimony of Paul K. Wetherbee Exhibit No. \_\_\_(PKW-1CT).

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Additionally, the average of the most recent four years of other maintenance outages and deratings, forced outages and forced deratings of the units, called the planning forced outage rate are calculated and the available energy production is reduced by this average. In this case, the four-year average covers the time period 2010 through 2013. The forced outage rate of ███ percent for Colstrip Units 1 & 2 is calculated separately from the forced outage rate of ███ percent for Colstrip Units 3 & 4 because of the differences in the unit design and equipment.

**Q. What major overhauls did PSE include for the rate year?**

A. PSE included one outage and one unit derating planned during the rate year. Colstrip Unit 2 will be offline for █████ for its planned overhaul from ████ █████████████████ Colstrip Unit 1 will be reduced to ███████ of normal output █████████████████████ for █████ (████████ ████████████) for scrubber cleaning and repair.

**Q. What other assumptions are input to the AURORA model for the Colstrip units?**

A. The AURORA model uses several Colstrip-specific data inputs. In addition to the forced outage rate input, PSE’s AURORA model also includes (i) the four-year average heat rate for Colstrip Units 1 & 2 and Colstrip Units 3 & 4; (ii) the average transmission line losses of ███ percent on the Colstrip Project Transmission System; and (iii) the forecasted costs of coal and the average rate year coal heat content from the coal supplier’s annual operating plans.

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**Q. Does PSE anticipate making any updates to the rate year O&M expense for its jointly-owned facilities?**

A. PSE proposes to update production O&M expense for its jointly-owned facilities if information changes during the course of this proceeding.

## C. Operations and Maintenance Expense of PSE’s Simple- and Combined-Cycle Combustion Turbine Generation Facilities

### 1. Non-Major Maintenance and Operating Expense of PSE’s Simple- and Combined-Cycle Combustion Turbine Facilities

**Q. What is the basis for the calculation of O&M expense, other than major maintenance, for PSE’s owned and jointly-owned generation stations?**

A. As previously discussed, PSE generally uses a test year level of production O&M expense to represent a normal level of operating expenses for PSE's owned and operated gas fired turbines. For PSE’s jointly-owned gas fired turbine, Freddy 1, the plant operator’s budget, except for major maintenance costs, is used to represent the rate year level of production O&M expense. To summarize:

(i) The Goldendale, Mint Farm, Encogen, Sumas, Ferndale, Frederickson, Fredonia, Whitehorn and Crystal Mountain facilities rate year production O&M expense is based upon actual test year production O&M expense; and

(ii) The jointly-owned Freddy 1 rate year production O&M expense is based upon projected rate year operating costs provided by the plant operator, Atlantic Power Corporation (formerly Capital Power Corporation).

This methodology is consistent with the manner in which production O&M expense was determined in PSE's past several general rate case and power cost only rate case proceedings.

### 2. Major Maintenance of PSE’S Simple- and Combined-Cycle Combustion Turbine Facilities

**Q. What is the basis for major maintenance events and expenditures included in this filing?**

A. Major maintenance included in this proceeding reflects the rate making treatment as established in the 2013 PCORC.[[5]](#footnote-6) In general, if the cost of a major maintenance event performed at any of PSE’s gas fired generating facilities is $500,000 or greater, the costs incurred shall be deferred and amortized over the period until the next scheduled equivalent major maintenance event for that facility. The deferred amount will not be treated as a regulatory asset. If a major maintenance event occurs during the test year but does not meet the $500,000 threshold, the cost of the major maintenance will be included in test year production O&M expense as incurred. Amortization associated with events that have occurred prior to and during the test year have been included in the rate year to the extent that the associated amortization occurs within the rate year. Amortization that ends prior to the rate year is excluded from the rate year. Finally, amortization associated with major maintenance events that occur after the test year but that are known and measurable at the time of the evidentiary hearing are to be included in rate year production O&M expense.

**Q. What is the cost for major maintenance associated with PSE’s owned and jointly-owned simple- and combined-cycle combustion turbine facilities included in this proceeding?**

A. PSE’s rate year major maintenance expense is $8.0 million as compared to $2.4 million in the 2014 PCORC and $4.7 million in the test year. Please see Exhibit No. \_\_\_(RJR-26C) for amortization included in this proceeding’s rate year. Once the 2017 events have been completed and the costs become known, the associated amortization will be recalculated based upon known and measurable costs and incorporated into this filing.

The timing of the 2017 major maintenance events at Freddy 1, Mint Farm, and Sumas Generating Stations are based upon original equipment manufacturer’s recommendations (and as specified in the long term maintenance agreements with respect to the Freddy 1 and Mint Farm combustion turbines). The timing of the major maintenance events at Encogen and Whitehorn generating facilities were predicated upon observed condition and identified operational issues with these units.

### 3. Status of Major Maintenance Contracts / Equipment Upgrades at Goldendale and Mint Farm

**Q. What is the status of major maintenance contracts for PSE’s thermal generating facilities?**

A. PSE currently has long term major maintenance contracts with GE International to provide combustion turbine major maintenance services at the Goldendale Generating Station and Mint Farm Generating Station. The contracts are effective December 14, 2015, and expire in 2037. These contracts replace long term maintenance contracts with GE International that were to expire at Goldendale Generating Station and Mint Farm Generating Station in 2016 and 2026, respectively. There is also a long term maintenance contract with GE International at Freddy 1 that will expire in 2018.

**Q. What factors affected the timing of the new contracts at Goldendale Generating Station and Mint Farm Generating Station?**

A. The previous long term maintenance contract at Goldendale Generating Station was to expire in 2016 upon the completion of the combustion turbine major inspection performed in June of 2016. In September 2015, GE International approached PSE and proposed an extension of both the Goldendale and Mint Farm contracts in conjunction with favorable pricing of certain upgrades to combustion turbine components for both units. The timing of the contract renewals permitted the upgraded components to be installed at Goldendale Generating Station during the 2016 major inspection and the upgrade of components at Mint Farm Generating Station when the major inspection is performed at that facility in 2017.

**Q. Pleases describe the nature of the component upgrades.**

A. The new contracts with GE International include upgrades to the combustion turbines collectively referred to in the contracts as the “Optimization Package”: These include the following:

* upgraded components in the combustion section (the DLN 2.6+ package) at both Goldendale Generating Station and Mint Farm Generating Station;
* upgraded components in the turbine sections (the AGP package) at both Goldendale Generating Station and Mint Farm Generating Station;
* modification to the compressor section at Mint Farm Generating Station; and
* upgrades to the software that controls the fuel flow to the units (the Opflex package).

The advantages to be realized from the installation of the Optimization Package include an increase in the generating capacity of the units, an increase in the efficiency of the units (the amount of energy generated per BTU of fuel consumed, or “heat rate”), and greater flexibility in the ability to run the units at less than full load (“turn-down capacity”).

**Q. Are there any other advantages to be realized from the installation of the optimization packages?**

A. Yes. The new combustion section components have a useful life of 24,000 hours as compared to the 12,000 hour life of the original combustion components. Accordingly, PSE will not need to perform combustion inspections between the major and hot gas path major maintenance events as was the case prior to the upgrade.

Additionally, the compressor modifications at Mint Farm Generating Station will reduce risk of a compressor failure significantly due to new component geometry.

**Q. Do the contracts guarantee these performance improvements?**

A. Yes. The contracts specify minimum improvements in performance associated with installation of the optimization packages. In the case of Goldendale Generating Station, the generating capacity was guaranteed to increase by ███ percent, and the heat rate was guaranteed to be reduced by ██ percent. In the case of Mint Farm Generating Station, the generating capacity was guaranteed to increase by ██ percent, and the heat rate was guaranteed to be reduced by ██ percent.

The differences in the guaranty values between the Goldendale and Mint Farm contracts are due to the fact that, as originally configured, Mint Farm Generating Station was operating at a higher firing temperature and was thus thermodynamically more efficient prior to the upgrade. Additionally, Goldendale Generating Station is located in eastern Washington at an elevation of 1,637 feet, and Mint Farm Generating Station is located in western Washington at an elevation of 20 feet, resulting in different operating environments of air pressure, temperature and humidity.

**Q. Have the performance improvements been achieved at Goldendale Generating Station** **subsequent to the installation of the Optimization Package in 2016?**

A. Yes. Performance testing was performed post-installation, and the output of the Goldendale Generating Station combustion turbine increased ███ MW or ███ percent. Performance tests demonstrated a post-installation heat rate of ████ BTU/kW, a ██ percent improvement from the pre-installation performance. Guaranteed performance is referenced to ISO standard temperatures and ambient conditions. The performance guarantees have been validated by site personnel and fall within the test tolerances.

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**Q. Have the performance improvements that have been achieved at Goldendale Generating Station** **and are anticipated at Mint Farm Generating Station** **been incorporated into the calculation of power cost in this proceeding?**

A. Yes. Please see the Prefiled Direct Testimony of Paul K. Wetherbee, Exhibit No. \_\_\_(PKW-1CT), for a discussion of how PSE incorporated the performance improvements that have been achieved at Goldendale Generating Station and are anticipated at Mint Farm Generating Station into the calculation of power cost in this proceeding. Additionally, please see the Prefiled Direct Testimony of Katherine J. Barnard, Exhibit No. \_\_\_(KJB-1T), for a discussion of how PSE incorporated the capital costs associated with these upgrades in this proceeding.

## D. Operations and Maintenance Expense of PSE’s Hydroelectric Generation Facilities

**Q. How has PSE prepared its forecast of hydroelectric production O&M expense for the rate year?**

A. PSE developed the rate year production O&M expense for hydroelectric projects in a manner consistent with the development of O&M expenses in PSE’s 2014 PCORC. PSE utilizes test year O&M expense and then makes certain pro forma adjustments as previously allowed by the Commission.

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**Q. What is PSE’s forecast of hydro O&M for the rate year?**

A. The forecast for rate year hydro production O&M costs is $17.8 million, an increase of approximately $1.9 million relative to the hydro production O&M costs of $15.9 million from the 2014 PCORC.

**Q. Please summarize the hydro production O&M costs.**

A. Hydro production O&M costs are summarized in Table 4 below.

**Table 4. Hydro Production O&M Costs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resources** | **Test Year10/01/2015 - 09/30/2016** | **Adjustments** | **2017 GRCJan - Dec2018** | **2014 PCORCDec 14 -****Nov 15** | **2017 GRCvs. 2014PCORC asFiled** |
| Lower Baker | $4,763,084 | – | $4,763,084 | $4,137,204 | $625,880 |
| Upper Baker | $4,413,567 | – | $4,413,567 | $4,299,468 | $114,099 |
| Baker License | $2,499,722 | $456,830 | $2,956,552 | $2,398,675 | $557,878 |
| Electron | $10,335 | ($10,335) | – | $2,009,672 | ($2,009,672) |
| Snoqualmie 1/2 | $5,169,224 | – | $5,169,224 | $2,446,632 | $2,722,592 |
| Snoqualmie License | $403,706 | $134,377 | $538,084 | $605,327 | ($67,244) |
| **Total Hydro O&M** | **$17,259,638** | **$580,872** | **$17,840,511** | **$15,896,978** | **$1,943,533** |

**Q. What is the nature of the adjustments PSE has made to test year hydro production O&M expense?**

A. PSE has increased test year hydro production O&M by $580,872 to reflect budgeted rate year FERC license costs associated with the Baker River Hydroelectric Project and the Snoqualmie Falls Hydroelectric Project. This is consistent with treatment of license costs in the 2013 and 2014 PCORC filings.

## E. Operations and Maintenance Expense of PSE’s Wind Generation Facilities

### 1. Wind Production O&M Costs

**Q. What is PSE’s forecast of wind generation O&M for the rate year?**

A. The forecast for rate year wind production O&M costs is $33.7 million, an increase of approximately $3.5 million relative to the 2014 PCORC wind production O&M costs of $30.2 million.

**Q. Please summarize the wind production O&M costs.**

A. Please see Table 5 below for a summary of wind production O&M costs.

**Table 5. Wind O&M Costs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resources** | **Test Year10/01/2015 - 09/30/2016** | **Adjustments** | **2017 GRCJan - Dec2018** | **2014 PCORCDec 14 -****Nov 15** | **2017 GRCvs. 2014PCORC asFiled** |
| Hopkins Ridge | $6,507,378 | $64,733 | $6,572,112 | $5,127,642 | $1,444,469 |
| Wild Horse | $10,879,887 | $256,116 | $11,136,003 | $10,958,274 | $177,728 |
| Wild Horse Expansion | $1,278,119 | ($145,679) | $1,132,441 | $1,654,444 | ($522,003) |
| Lower Snake River | $12,395,839 | $2,497,203 | $14,893,042 | $12,441,421 | $2,451,621 |
| **Total Wind O&M** | **$31,061,224** | **$2,672,373** | **$33,733,597** | **$30,181,781** | **$3,551,816** |

**Q. What is the nature of the adjustments PSE has made to test year wind production O&M expense?**

A. PSE has made adjustments to test year wind production O&M that total $2.7 million as described below:

(i) added $2 5 million to test year wind production O&M to reflect projected rate year contract maintenance costs under the Siemens maintenance contract for the Lower Snake River Wind Generating Station (please see the discussion regarding the Siemens contract below);

(ii) added $0.2 million to test year wind production O&M to reflect projected rate year contract maintenance costs under the Vestas maintenance contracts for the Hopkins Ridge and Wild Horse/Wild Horse Expansion Wind Generating Stations (please see the discussion regarding the Vestas contract extension below); and

(iii) added $0.1 million to test year wind production O&M expense to reflect projected rate year royalty costs under the royalty contracts for the Hopkins Ridge, Wild Horse/Wild Horse Expansion, and Lower Snake River Phase 1 Wind Generating Stations based upon projected rate year wind generation.

**Q. Please explain PSE’s proposed adjustment to wind royalty expense.**

A. Wind turbine production royalties represent variable dollar per MWh fees paid under contract to project stakeholders. These fees are based on the actual generation of PSE’s wind turbines. Consistent with the treatment in the 2014 PCORC, PSE has pro formed the royalty costs based upon the wind generation included in the rate year projected power costs. The rate year royalty expenses for PSE’s wind facilities have increased to $6.9 million for the rate year as compared to $6.8 million for the 2014 PCORC (i.e., a rate year-to-rate year increase of $0.1 million).

**Q. Do the wind turbine production royalty payments reflect contract increases?**

A. Yes. In accordance with the terms of PSE’s development and land lease agreements with project stakeholders, the annual royalty rate paid per MWh of energy production is subject to an annual adjustment for inflation.

**Q. How is routine and corrective maintenance provided for the wind turbines?**

A. PSE’s wind turbines at Hopkins Ridge, Wild Horse, and the Wild Horse Expansion Wind Generating Stations are maintained by the manufacturer (Vestas) in accordance with the terms of five-year service agreements. PSE has contracted with Siemens to provide all maintenance services at the Lower Snake River Phase 1 Wind Generating Station. The term of the initial contract with Siemens expires after five years following turbine commissioning on February 29, 2012.

### 2. New Siemens Wind Turbine Services Agreement Effective March 1, 2017

**Q. Please discuss the extension of the Siemens maintenance contracts at the Lower Snake River Wind Generating Station.**

A. With the scheduled expiration of the original Siemens Service and Maintenance Agreement and expiration of the five-year equipment warranty period on February 29, 2017, PSE evaluated alternative service options for the Lower Snake River Wind Generating Station. PSE’s evaluation of service options included a new agreement with Siemens, a new agreement with an independent service provider, and an option for PSE self-performance of the services.

PSE retained the international consulting firm of DNV/GL to assist in the evaluation of these options. On January 7, 2016, DNV/GL issued its Operations Benchmark and Forecast Study, which reviewed the common turbine services alternatives and provided a range of expected costs, major component reliability risks, and a forecast of potential future costs. Please see Exhibit No. \_\_\_(RJR-27) for a copy of the DNV/GL Operations Benchmark and Forecast Study.

**Q. What were the results of the DNV/GL Operations Benchmark & Forecast Study?**

A. DNV/GL reported that wind turbine service costs tend to increase with additional years in operation as more major components require replacement. The reliability of generators, gearboxes, blades, main bearings, and pitch bearings were all identified as major lifecycle cost uncertainties, with increasing risk in future years. These major components are expensive and represent the greatest cost variability in the operating lifecycle of the turbine. Based on data from its clients, DNV/GL benchmarked actual turbine median O&M cost from 2010 to 2014 to be in the range of █████ to █████ per MW, or in the range of █████ to █████ for a Siemens 2.3 MW turbine. O&M cost in future years was expected to be at least 15%-20% higher, plus annual escalation.

**Q. How did PSE use the DNV/GL Operations Benchmark and Forecast Study to inform its service evaluation process?**

A. PSE had been monitoring the development and maturity of independent turbine services providers for several years, and believed that market competition was creating high-quality providers with favorable risk and cost structures. To test that market, PSE developed a comprehensive Request for Proposals for Wind Turbine Maintenance that included all scheduled and unscheduled services, all spare parts, a performance warranty, monitoring and surveillance of turbine operations, and control software maintenance and updates. Please see Exhibit No. \_\_\_(RJR-28) for a copy of the Request for Proposals for Wind Turbine Maintenance issued by PSE. PSE selected four candidate service providers based on their experience, customer feedback, and PSE’s own evaluation of the service product being offered. PSE released the Request for Proposals for Wind Turbine Maintenance, dated February 22, 2016.

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**Q. What services did PSE request through the Request for Proposals for Wind Turbine Maintenance?**

A. In the Request forProposals for Wind Turbine Maintenance, PSE asked potential service providers to perform all scheduled and unscheduled services, diagnostics, repair, and replacements on the wind turbines from the top of the foundation to the tip of each blade including all towers, turbines, electrical cables/equipment, fiber/communication equipment, blades, climb assist, wind turbine generator aviation lights, wind turbine generator anemometers, supervisory control and data acquisition (SCADA) system, and miscellaneous appurtenances.

The Request forProposals for Wind Turbine Maintenance asked for proposals to be structured as warranty-like with all included services to be provided for a fixed annual fee. The fixed fee concept reduced PSE’s overall cost exposure due to major component failure risk, and provided incentives to the service providers to improve maintenance efficiency and equipment performance.

**Q. What were the results of the Request for Proposals for Wind Turbine Maintenance process?**

A. PSE received three compliant proposals for wind turbine services at Lower Snake River Wind Generating Station and evaluated them on the basis of cost (30% weight), risk (25% weight), contractor capability (25% weight), and expected service quality (10% weight). After discussion with the contractors and internal team, Siemens was the service provider with the highest overall score. Negotiations commenced on the terms of a definitive service agreement shortly thereafter, and the new agreement was signed September 23, 2016. Please see Exhibit No. \_\_\_(RJR-29C) for a copy of the new Siemens wind turbine services agreement.

**Q. What is the term and expected cost of the new Siemens wind turbine services agreement?**

A. The new Siemens wind turbine services agreementbecomes effective on March 1, 2017, and remains in effect until March 1, 2027. The per-turbine annual service fee starts at $████ and increases based only on published escalation benchmarks.

**Q. Were maintenance costs expected to increase substantially as the original Siemens wind turbine services agreement is replaced with the new Siemens wind turbine services agreement?**

A. Yes. Based on the per turbine cost of the original Siemens wind turbine services agreement, wind turbine maintenance costs were fixed and increased only at a rate tied to normal inflationary benchmarks. Only scheduled maintenance services were provided under the terms of the original Siemens wind turbine services agreement. Unscheduled services were *not* covered by the original Siemens wind turbine services agreement but were included under the terms of the original five-year warranty agreement included with the turbine purchase. Following expiration of the turbine warranty, unscheduled services are no longer covered by the warranty agreement, and PSE expected increased costs in future years, just as with other types of power generation facilities.

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**Q. Does Siemens provide a performance warranty on the wind turbines in the new Siemens wind turbine services agreement?**

A. Yes. During the ten-year term of the new Siemens wind turbine services agreement, Siemens will provide a warranty on turbine availability performance, and on spare parts availability. The base availability performance warranty is set at an average of █%. Should the actual availability fall below this level, Siemens pays liquidated damages to PSE, calculated based on a defined formula within the service agreement. Likewise, PSE pays Siemens an incentive bonus if availability exceeds █% during any twelve-month production period. The availability bonus is capped at $█████ for any availability period.

The spare parts availability warranty provides an incentive in the form of $███ per day liquidated damages to insure that all spare parts critical to the operation of individual wind turbines remain available over the term of the new Siemens wind turbine services agreement.

**Q. How does PSE monitor and manage its contractors for compliance with the terms of the new Siemens wind turbine services agreement?**

A. PSE’s internal staff, the turbine manufacturer’s workforce, and other third-party service providers work together to conduct maintenance services at PSE’s wind facilities. PSE’s wind facility staff manages this collaboration to ensure compliance with safety and environmental procedures, contract requirements, avoid miscommunication, and establish appropriate staging and responsibility boundaries.

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**Q. Does the new Siemens wind turbine services agreement represent a good value to PSE’s ratepayers?**

A. Yes. The new Siemens wind turbine services agreementis designed to reduce performance and maintenance cost risk over the next ten years, provide a steady supply of spare parts long after these turbines have gone out of production, assure high turbine availability to optimize wind power production, maintain a safe environment for workers and the community, and does so at a competitive market-tested cost.

# IV. CONCLUSION

Q. Does this conclude your prefiled direct testimony?

A. Yes.

1. U.S. Energy Information Administration, Electric Power Monthly, Data for October 2016 Table 1.1 (Net Generation by Energy Source: Total (All Sectors), 2006-October 2016 (Dec. 23, 2016), available at <http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_1> (showing an increase in power generation from natural gas facilities from 1,126,609 GWh in 2014 to 1,333,482 GWh in 2015). [↑](#footnote-ref-2)
2. T. Lutey, “Colstrip Operator Wants Out in 2 Years or Less,” *The Billings Gazette* (May 24, 2016), available at <http://billingsgazette.com/news/government-and-politics/colstrip-operator-wants-out-in-years-or-less/article_68a897f9-ff08-536f-b360-32d585162cce.html>. [↑](#footnote-ref-3)
3. Although the Black & Veatch study was protected by the work product privilege during litigation, PSE no longer asserts privilege for this document due to the settlement. However, production of this document in this proceeding does not waive privilege as to any other document. [↑](#footnote-ref-4)
4. Appendix A of the Final Order No. 04 approving and adopting the Settlement Stipulation between PSE, Staff of the Washington Utilities and Transportation Commission (“Commission Staff”), Public Counsel and Industrial Customers of Northwest Utilities (“ICNU”) in PSE’s 2014 PCORC. [↑](#footnote-ref-5)
5. Docket UE-130616, Order 06 7:20; Settlement Stipulation 6:17-8:19. [↑](#footnote-ref-6)