

**EXH. ZCY-1CT  
DOCKETS UE-22 \_\_\_/UG-22 \_\_\_  
2022 PSE GENERAL RATE CASE  
WITNESS: ZACARIAS C. YANEZ**

**BEFORE THE  
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

**WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,**

**Complainant,**

**v.**

**PUGET SOUND ENERGY,**

**Respondent**

**Docket UE-22 \_\_\_**

**Docket UG-22 \_\_\_**

**PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF**

**ZACARIAS C. YANEZ**

**ON BEHALF OF PUGET SOUND ENERGY**

**REDACTED VERSION**

**JANUARY 31, 2022**

**PUGET SOUND ENERGY**

**PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF  
ZACARIAS C. YANEZ**

**CONTENTS**

I. INTRODUCTION..... 1

II. EXTENSION OF THE COLVILLE SLICE AGREEMENT  
EXTENSION IS PRUDENT..... 4

    A. Background and Key Terms of the Colville Slice Agreement  
    Extension..... 4

    B. Need for the Colville Slice Agreement Extension..... 7

    C. Comparison of the Colville Slice Agreement Extension to  
    Alternatives..... 9

    D. The Colville Slice Agreement Extension is Used and Useful..... 17

    E. Involvement of PSE Management..... 18

    F. Benefits of the Colville Slice Agreement Extension..... 18

III. ACQUISITION OF THE CHELAN SLICE AGREEMENT IS  
PRUDENT..... 20

    A. Background and Key Terms of the Chelan Slice Agreement..... 20

    B. Need for the Chelan Slice Agreement..... 22

    C. Comparison of the Chelan Slice Agreement to Alternatives ..... 24

    D. The Chelan Slice Agreement is Used and Useful..... 28

    E. Involvement of PSE Management..... 28

    F. Benefits of the Colville Slice Agreement Extension..... 28

IV. CONCLUSION.....30

**PUGET SOUND ENERGY**

**PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF  
ZACARIAS C. YANEZ**

**LIST OF EXHIBITS**

Exh. ZCY-2	Professional Qualifications of Zacarias C. Yanez
Exh. ZCY-3C	Valuation Summary
Exh. ZCY-4C	Presentations to PSE's Energy Management Committee
Exh. ZCY-5C	Hydro Contracts

1 **PUGET SOUND ENERGY**

2 **PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF**  
3 **ZACARIAS C. YANEZ**

4 **I. INTRODUCTION**

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

7 A. My name is Zacarias C. Yanez. My business address is 355 110th Avenue NE,  
8 Bellevue, Washington, 98004. I am a Commercial Acquisitions Manager in the  
9 Resource Acquisitions team for Puget Sound Energy (“PSE”).

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

12 A. Yes, I have. It is Exh. ZCY-2.

13 **Q. What are your duties as Commercial Acquisitions Manager?**

14 A. As Commercial Acquisitions Manager, my responsibilities include the following:

- 15 1. Leading the evaluation and negotiation of mid-term  
16 (i.e., three- to five-year) power contracts and acquisitions.
- 17 2. Assisting the acquisition of electric resources and long-term  
18 (i.e., greater than five years) power contracts.

1 **Q. Please summarize the contents of your testimony.**

2 A. This prefiled direct testimony seeks a finding of prudence and cost recovery for:

3 1. A three-year (36-month) extension with Public Utility  
4 District No. 1 of Douglas County (“Douglas PUD”) of a  
5 then-existing agreement (the “Colville Slice Agreement”)  
6 with the Confederated Tribes of the Colville Reservation’s  
7 (the “Colville Tribe”) five and one-half percent (5.5%) share  
8 of the output of the Wells Hydroelectric Project (the  
9 “Colville Slice Agreement Extension”).

10 2. A Slice Agreement with Public Utility District No. 1 of  
11 Chelan County (“Chelan PUD”) for a five percent (5%)  
12 share of the output of the Rocky Reach and the Rock Island  
13 Hydroelectric Projects (the “Chelan Slice Agreement”).

14 **Q. What is PSE’s understanding of the Commission’s prudence standard?**

15 A. In PSE’s 2003 Power Cost Only Rate Case proceeding, Docket UE-031725, the  
16 Commission reaffirmed its prudence standard:

17 The test the Commission applies to measure prudence is what a  
18 reasonable board of directors and company management would have  
19 decided given what they knew or reasonably should have known to  
20 be true at the time they made a decision. This test applies both to the  
21 question of need and the appropriateness of the expenditures. The  
22 company must establish that it adequately studied the question of  
23 whether to purchase these resources and made a reasonable decision,  
24 using the data and methods that a reasonable management would  
25 have used at the time the decisions were made.<sup>1</sup>

26 In addition to this reasonableness standard, the Commission has cited several  
27 specific factors that inform the question of whether a utility’s decision to acquire  
28 a new resource was prudent. These factors include the following:

---

<sup>1</sup> *WUTC v. Puget Sound Energy*, Docket UE-031725, Order 12 ¶ 19 (Apr. 7, 2004).

- 1 1. First, the utility must determine whether new resources are  
2 necessary.<sup>2</sup>
- 3 2. Once a need has been identified, the utility must determine  
4 how to fill that need in a cost-effective manner. When a  
5 utility is considering the purchase of a resource, it must  
6 evaluate that resource against the standards of what other  
7 purchases are available and against the standard of what it  
8 would cost to build the resource itself.<sup>3</sup>
- 9 3. The utility must analyze the resource alternatives using  
10 current information that adjusts for such factors as end  
11 effects, capital costs, impact on the utility's credit quality,  
12 dispatchability, transmission costs, and whatever other  
13 factors need specific analysis at the time of a purchase  
14 decision.<sup>4</sup>
- 15 4. The utility should inform its board of directors and/or  
16 management about the purchase decision and its costs. The  
17 utility should also involve the board of directors and/or  
18 management in the decision process.<sup>5</sup>
- 19 5. The utility must keep adequate contemporaneous records  
20 that will allow the Commission to evaluate its actions with  
21 respect to the decision process. The Commission should be  
22 able to follow the utility's decision process, understand the  
23 elements that the utility used, and determine the manner in  
24 which the utility valued these elements.<sup>6</sup>

25 **Q. Did PSE's decisions to enter into the Colville Slice Agreement Extension and**  
26 **the Chelan Slice Agreement meet this prudence standard?**

27 A. Yes. Both the Colville Slice Agreement Extension and the Chelan Slice  
28 Agreement are fixed price contracts that allow PSE to: (1) meet a portion of

---

<sup>2</sup> See e.g., *WUTC v. Puget Sound Power & Light Co.*, Docket UE-921262, et al., Nineteenth Supplemental Order at 11 (Sept. 27, 1994).

<sup>3</sup> *Id.* at 11.

<sup>4</sup> *Id.* at 2, 33-37, 46-47.

<sup>5</sup> *Id.* at 37, 46.

<sup>6</sup> *Id.* at 2, 37, 46.

1 the firm resource adequacy-qualifying contract needs anticipated in the  
2 2021 Integrated Resource Plan; (2) acquire a valuable hydroelectric  
3 resource at a time when PSE is entering into the compliance period for the  
4 Clean Energy Transformation Act (“CETA”);<sup>7</sup> and (3) access the region’s  
5 valuable and scarce hydroelectric resources. In addition, for both the  
6 Colville Slice Agreement Extension and the Chelan Slice Agreement, PSE  
7 performed the analyses, decision-making and documentation processes  
8 expected by the Commission, as further described in this prefiled direct  
9 testimony.

10 **II. EXTENSION OF THE COLVILLE SLICE**  
11 **AGREEMENT EXTENSION IS PRUDENT**

12 **A. Background and Key Terms of the Colville Slice Agreement Extension**

13 **Q. Please describe the Colville Tribe’s five and one-half percent share of the**  
14 **output of the Wells Hydroelectric Project.**

15 A. The Wells Hydroelectric Project (“Wells Project”) is a 10-unit,  
16 840 megawatt (“MW”) hydroelectric facility owned and operated by Douglas  
17 PUD and located on the Columbia River. The Wells Project began commercial  
18 operation in 1967. The Federal Energy Regulatory Commission (“FERC”) issued  
19 a new 40-year license for the Wells Project in May 2012. The Wells Project

---

<sup>7</sup> Chapter 19.405 RCW.



1 produces an average of four million megawatt-hours (“MWh”) of electricity per  
2 year.

3 On November 1, 2004, Douglas PUD entered into a Settlement Agreement and a  
4 Power Sales Contract with the Colville Tribe as part of the FERC licensing  
5 proceeding. FERC approved both the Settlement Agreement and the Power Sales  
6 Contract on February 11, 2005.

7 Based on the terms of the Power Sales Contract, the Colville Tribe is entitled to  
8 purchase four and one-half percent (4.5%) of the output of the Wells Project  
9 through August 31, 2018, and five and one-half percent (5.5%) of the output of  
10 the Wells Project beginning September 1, 2018.

11 **Q. Describe the key terms of the Colville Slice Agreement executed by PSE**  
12 **in 2018.**

13 A. The Colville Tribe offered to sell its five and one-half percent (5.5%) of the  
14 output of the Wells Project beginning September 1, 2018. In June 2018, PSE and  
15 Douglas PUD executed the Colville Slice Agreement for the Colville Tribe’s  
16 share of the output of the Wells Project. The Colville Tribe Slice Agreement  
17 (i) entitled PSE to five and one-half percent (5.5%) of the output of the Wells  
18 Project, (ii) had a fixed monthly price of \$ [REDACTED] per month, and (iii) a term of  
19 September 1, 2018, through September 30, 2021.

20  
SHADED INFORMATION IS  
DESIGNATED AS CONFIDENTIAL PER  
WAC 480-07-160

1 The Commission previously approved the prudence of PSE’s purchase of the  
2 Colville Slice Agreement as part of its approval of various new resources in  
3 PSE’s general rate case in dockets UE-190529 and UG190530.<sup>8</sup>

4 **Q. Describe the key terms of the Colville Slice Agreement Extension executed**  
5 **in 2021.**

6 A. The Colville Slice Agreement Extension is a 36-month contract with a term from  
7 October 1, 2021, through September 30, 2024. The Colville Slice Agreement  
8 Extension effectively extends the Colville Slice Agreement, which would have  
9 otherwise expired on September 30, 2021.

10 When paired with existing Mid-C transmission rights held by PSE on the  
11 transmission system of the Bonneville Power Administration, the Colville Slice  
12 Agreement Extension provides PSE with approximately (i) 42.5 MW of  
13 dispatchable and flexible capacity, (ii) 370 MWh of storage, and  
14 (iii) 226,000 MWh of clean, zero-emission energy to contribute toward PSE’s  
15 resource needs.<sup>9</sup>

16 PSE negotiated a fixed monthly payment of \$ [REDACTED] a month—about \$ [REDACTED]  
17 per MWh assuming historical average water conditions—and an exclusive [REDACTED]-day  
18 renegotiation period for a potential future extension.

---

<sup>8</sup> See *WUTC v. Puget Sound Energy*, Dockets UE-190529/UG-190530, Order 8 ¶¶ 35, 799 and App’x A (July 8, 2020); see also Prefiled Direct Testimony of Paul K. Wetherbee, Exh. PKW-1CT (June 20, 2019), at pp. 34-37.

<sup>9</sup> Based on an average of 80 years of hydrological history.

1 **B. Need for the Colville Slice Agreement Extension**

2 **Q. Please describe the need for the Colville Slice Agreement Extension.**

3 A. The Colville Slice Agreement Extension is a fixed price contract that allows PSE  
4 to meet a portion of the firm resource adequacy-qualifying contract needs  
5 identified in the 2021 Integrated Resource Plan. PSE currently relies on up to  
6 1,500 MW of short-term market purchases to meet capacity need. The Colville  
7 Slice Agreement Extension will replace approximately 42.5 MW of those short-  
8 term market purchases, thereby reducing the risk of uncertain resource availability  
9 at times when the market may be constrained.

10 Additionally, the Colville Slice Agreement Extension allows PSE to retain a  
11 valuable hydroelectric resource at a time when PSE is entering into the CETA  
12 compliance period.<sup>10</sup> Opportunities to acquire additional hydroelectric power are  
13 already scarce, and PSE anticipates that securing clean, emission-free resources—  
14 particularly those that offer flexible dispatch—may become even scarcer in the  
15 future. The flexibility and emission-free nature of the output of the Wells Project  
16 will continue to provide valuable qualitative and quantitative benefits to PSE and  
17 its customers over the life of this extension and any potential extensions.

18 Finally, the Colville Slice Agreement Extension maintains PSE's access to one of  
19 the region's most valuable and scarce hydroelectric resources. The output of the  
20 Wells Project is flexible and allows frequent and rapid changes to generation

---

<sup>10</sup> Chapter 19.405 RCW.

1 levels. PSE can use this flexible dispatch to balance its system within each hour  
2 and to respond to rapid changes in load or the output of other resources, especially  
3 renewable energy resources.

4 **Q. What would have been the risk if PSE had chosen not to enter into the**  
5 **Colville Slice Agreement Extension?**

6 A. If PSE had not chosen to enter into the Colville Slice Agreement Extension in  
7 early 2021, PSE would have risked losing a valuable non-emitting, flexible  
8 capacity resource to another party when the Colville Slice Agreement expired in  
9 accordance with its terms on September 30, 2021.

10 As previously described, the Colville Slice Agreement Extension secures a slice  
11 of the valuable output of the Wells Project for PSE's portfolio for an additional  
12 three years (through September 30, 2024) and includes an exclusive ■-day  
13 negotiation period to further extend the Colville Slice Agreement in the future.  
14 The Colville Slice Agreement Extension offers a significant amount of emission-  
15 free dispatch capacity at a time when PSE is seeking resources that will help  
16 improve reliability and reduce emissions.

**REDACTED VERSION**

1 C. Comparison of the Colville Slice Agreement Extension to Alternatives

2 Q. **What alternatives did PSE consider in its analysis of the Colville Slice**  
3 **Agreement Extension?**

4 A. PSE had a limited window in which to make a decision about whether it would  
5 submit an offer to compete and ultimately execute contracts for the Colville Slice  
6 Agreement Extension. In late 2020, Douglas PUD notified PSE that the Colville  
7 Tribe would be conducting an auction to sell its share (or “slice”) of the Wells  
8 Project after the expiration of the Colville Slice Agreement with PSE on  
9 September 30, 2021. In January 2021, PSE further learned that the Colville Tribe  
10 (i) had received an offer from a third party to acquire its rights to the output of the  
11 Wells Project starting on October 1, 2021, and (ii) had decided not to conduct its  
12 planned auction. PSE subsequently made an offer to extend the Colville Slice  
13 Agreement for a term of three years, which the Colville Tribe ultimately accepted.

14 The limited window of opportunity to consider the Colville Slice Agreement  
15 Extension concluded prior to PSE issuing its 2021 All-Source Request for  
16 Proposals (the “2021 RFP”) on June 30, 2021. This prevented PSE from  
17 evaluating the Colville Tribe Agreement Extension as part of its competitive  
18 2021 RFP process. To accommodate the accelerated schedule, PSE compared the  
19 Colville Slice Agreement Extension to short-term market purchase alternatives.

1 **Q. Describe PSE’s approach to analyzing the value of the Colville Slice**  
2 **Agreement Extension.**

3 A. PSE analyzed the value of the Colville Slice Agreement Extension by calculating  
4 the total portfolio cost differential between:

- 5 • The existing PSE electric portfolio without the Colville Slice  
6 Agreement Extension; and
- 7 • The existing PSE electric portfolio with the Colville Slice  
8 Agreement Extension.

9 PSE grouped the total portfolio benefits as follows:

- 10 1. Avoided Energy Value. To calculate the expected Avoided  
11 Energy Value of the Colville Slice Agreement Extension,  
12 PSE used (i) available forward marks over the extension’s  
13 term to estimate the future value of the energy, and  
14 (ii) assumed output volumes under the Colville Slice  
15 Agreement Extension.
- 16 2. Flexibility Value. The Flexibility Value consists of two  
17 components: (i) operational optimization, and (ii) a  
18 flexibility credit. PSE forecasted the benefit of operational  
19 optimization by modeling the optimal dispatch of PSE’s  
20 power portfolio, with and without the Colville Slice  
21 Agreement Extension. PSE calculated the flexibility credit  
22 by applying a penalty to flexibility violations in the  
23 modeling of the optimal dispatch of PSE’s power portfolio  
24 model, with and without the Colville Slice Agreement  
25 Extension.
- 26 3. Avoided Carbon Emission Value. PSE modeled two carbon  
27 pricing scenarios to model a “floor” and a “cap” for the  
28 potential value of avoiding carbon emissions: (i) Scenario 1,  
29 “floor,” is a market-based price scenario that used a forecast  
30 of California carbon prices as a proxy for the emissions  
31 value, and (ii) Scenario 2, “cap,” used the Social Cost of  
32 Carbon as a proxy for the emissions value.

1 PSE calculated these three value streams for 2022 and applied each of the values  
2 to the forward energy prices during the term of the Colville Slice Agreement  
3 Extension to calculate the projected total value of the Colville Slice Agreement  
4 Extension to PSE.

5 **Q. Please describe the model PSE used to perform the analysis of the Colville**  
6 **Slice Agreement Extension.**

7 A. PSE assessed the value of the Colville Slice Agreement Extension using the  
8 PLEXOS software by Energy Exemplar. PLEXOS is one of the most  
9 sophisticated software platforms in the industry today that uses mathematical  
10 optimization combined with advanced handling and visualization to provide a  
11 high-performance, robust simulation system for electric power, water, and gas. It  
12 is a multi-time-step chronological production simulation model utilizing mixed-  
13 integer programming (MIP) to simulate the electric power market and co-optimize  
14 energy and ancillary service provisions.

15 From 2015, PSE has utilized Plexos software to model its electric portfolio in  
16 support of energy trading, resource maintenance scheduling, flexibility, and  
17 organized market rule analysis within the Western EIM market. PSE's Plexos  
18 model is composed of two zones, namely PSE zone and Mid-Columbia ("Mid-C")  
19 market zone. The PSE zone has up-to-date models of existing individual  
20 resources, including thermal, variable energy, hydro resources, and power  
21 contracts. Mid-C market zone represents the bilateral hub that PSE trades.

1 Complex hydro and storage modeling capability available in Plexos allow for  
2 high fidelity representation of the Mid-C hydro system and hydro constraints and  
3 water regulation in the model. The Plexos database and input assumptions for this  
4 analysis are consistent with the IRP process, as described on page G-54 of  
5 Appendix G in PSE 2021 IRP.

6 First, the base PSE portfolio model (Base Model) representing current electric  
7 system operation was established using the most up-to-date information at the  
8 time of the valuation of the Colville Slice Agreement Extension. This includes  
9 electric resource retirements and additions, updated contracts, Mid-C energy price  
10 forward mark, load forecast, fuel prices, hydro condition, and constraints.

11 Next, the valuation portfolio model (Contract Model) was prepared by adding the  
12 incremental Colville Slice contract on top of the existing Colville contract in the  
13 Base Model, including incremental inflow (cfs), incremental storage (acre-feet),  
14 and incremental generation capacity (MW). Based on PSE electric operation  
15 experience, adding hydro resource generation with storage capability like that  
16 provided by the Colville Slice Agreement Extension tends to reduce GHG-emitted  
17 resource production, increase operational flexibility, and improve trade efficiency.

18 Finally, the value of Colville Slice Agreement Extension was assessed by  
19 comparing the hourly production cost simulation output between the Contract  
20 Model and the Base Model under the same green-house gas assumptions, load  
21 serving obligations, and ancillary services requirements (contingency reserve,



1 regulation, and flexible ramping product). As summarized in the study results  
2 below and as shown in Exh. ZCY-3C, the valuation in Plexos recognizes key  
3 attributes that the Colville Slice Agreement Extension offers to PSE's portfolio:  
4 energy, storage, flexibility, and avoided carbon emissions.

5 **Q. Please describe the key assumptions PSE used in the analysis of the Colville**  
6 **Slice Agreement Extension.**

7 A. Key assumptions used by PSE in the analysis include: (i) PSE's existing resource  
8 portfolio, (ii) a forecast of forward power prices, (iii) the projected output  
9 provided under the Colville Slice Extension Agreement, and (iv) a forecast of  
10 forward carbon prices.

11 **Q. Please describe the forecast of forward power prices assumed by PSE for**  
12 **analysis of the Colville Slice Agreement Extension.**

13 A. PSE used the flat monthly forward mark provided by Platts as of February 2,  
14 2021. Platts is a service that provides forward prices based on Intercontinental  
15 Exchange settlement data. Next, PSE used the most recent available historical  
16 2020 hourly spot power prices to shape the flat monthly price forward price  
17 forecast. This shaping is done by taking the flat 2020 price by month and indexing  
18 each hourly price in the month to the average price, then applying the Platts  
19 forward mark to this index to develop a realistic hourly power price forecast for  
20 the evaluation. Finally, PSE used the power price forecast over the three-year

1 term of the Colville Slice Agreement Extension to estimate the future value of the  
2 energy displaced by the extension.

3 **Q. Please describe the projected output assumed by PSE for analysis of the**  
4 **Colville Slice Agreement Extension.**

5 A. PSE forecasted a monthly volume forecast for the Colville Slice Agreement  
6 Extension based on the average of historical 80-year monthly hydro volumes for  
7 the Wells Project. PSE then created a proxy daily volume by shaping the monthly  
8 Wells Project volume to a daily volume based on recent historical daily output  
9 data from BPA's Chief Joseph Hydro Project. PSE input the daily volume into the  
10 Plexos model for hourly commitment and dispatch optimization.

11 **Q. Please describe the two scenarios PSE considered when estimating the value**  
12 **of avoided carbon emissions used by PSE for analysis of the Colville Slice**  
13 **Agreement Extension.**

14 A. PSE used two scenarios to estimate the value of avoided carbon emissions to  
15 show a range of the value. The scenarios are described below:

16 (1) Scenario 1 - Market-based cost of carbon. This scenario represents the  
17 potential value PSE could receive if the region develops a carbon market. At the  
18 time PSE was evaluating this resource in February 2021, the Washington  
19 legislature was developing the Climate Commitment Act, SB 5126,<sup>11</sup> which

---

<sup>11</sup> SB 5126 was passed on April 24, 2021 and became effective on July 25, 2021.

1 included a Cap and Invest Program. While the final details were not known at the  
2 time, PSE believes it was appropriate to model the potential impact of the bill in  
3 its analyses. In addition, this scenario represents the potential value that other  
4 competitors for the Colville Slice contract might price into the bid if they plan to  
5 sell into California, which does have a mature carbon market. PSE used a forecast  
6 based on California carbon auction prices provided by Energy Exemplar, the  
7 developer of the Plexos and Aurora models used in PSE's 2021 IRP. Since  
8 Washington does not yet have established carbon market, the California carbon  
9 prices were deemed a good proxy for this market-based cost valuation. At the  
10 time of the evaluation, the California market carbon price was \$17.60 per ton, and  
11 PSE used this price to project a market-based avoided cost of carbon emissions of  
12 \$ [REDACTED] /MWh for the Colville Slice Agreement Extension.

13 (2) Scenario 2 - Social Cost of Carbon. Consistent with the way PSE conducts  
14 portfolio modeling for its Integrated Resource Planning and Request for Proposals  
15 processes, PSE's analysis of the Colville Slice Agreement Extension included the  
16 social cost of carbon by applying a social cost of carbon adder as fixed cost adder.  
17 By replacing unspecified market purchases with a carbon-free generation  
18 resource, PSE was able to consider the value of avoided carbon emissions  
19 provided by adding the Colville Slice Agreement Extension to PSE's power  
20 portfolio.

**REDACTED VERSION**

**SHADED INFORMATION IS  
DESIGNATED AS CONFIDENTIAL PER  
WAC 480-07-160**

1 PSE incorporated a social cost of carbon of \$76.70 per metric ton of carbon in its  
 2 analysis. Assuming that the energy from the Colville Slice Agreement Extension  
 3 replaces Mid-C market purchases, the Colville Slice Agreement Extension results  
 4 in an avoided social cost of carbon of \$ [REDACTED] per MWh.<sup>12</sup>

5 **Q. Please summarize the results of the evaluation of the Colville Slice**  
 6 **Agreement Extension.**

7 A. Table 1 below presents the results of the valuation of the Colville Slice  
 8 Agreement Extension.

**Table 1. Summary of Value Streams for the Colville Slice Agreement Extension (\$/MWh)**

<b>Value Streams</b>	<b>Scenario 1</b>	<b>Scenario 2</b>
Energy Value <sup>13</sup>	[REDACTED]	[REDACTED]
Flexibility Value	[REDACTED]	[REDACTED]
Avoided Carbon Emissions	[REDACTED]	[REDACTED]
Energy + Flexibility + Avoided Carbon Emissions (\$/MWh)	[REDACTED]	[REDACTED]
Annual Estimate Value (\$/MWh x Annual MWh)	[REDACTED]	[REDACTED]

[REDACTED VERSION]

<sup>12</sup> Consistent with the 2021 Integrated Resource Plan, the social cost of carbon is based on the social cost of carbon dioxide in 2007 dollars using the 2.5 percent discount rate, listed in table 2, technical support document: Technical update of the social cost of carbon for regulatory impact analysis under Executive Order No. 12866, published by the interagency working group on social cost of greenhouse gases of the United States government. The calculation assumes that market purchases have a rate of 0.437 metric tons per MWh.

<sup>13</sup> As previously discussed, PSE assumed a voided energy prices based on the average forward mark price as of February 2, 2021.

1 See also the Second Exhibit to the Prefiled Direct Testimony of Zacarias C.  
2 Yanez, Exh. ZCY-3C, for a summary of the analyses PSE performed to estimate  
3 the value of the Colville Slice Agreement Extension.

4 **D. The Colville Slice Agreement Extension is Used and Useful**

5 **Q. Is the Colville Slice Agreement Extension used and useful?**

6 A. Yes. As previously discussed, the Colville Slice Agreement had a term that was  
7 slightly longer than three years (i.e., September 1, 2018, through September 30,  
8 2021) and would have expired in accordance with its terms at the end of  
9 September 30, 2021. The Colville Slice Agreement Extension extended the non-  
10 price terms and conditions of the Colville Slice Agreement for an additional three  
11 years (through the end of September 30, 2024) and included an exclusive [REDACTED]-day  
12 renegotiation period for a potential future extension.

13 Accordingly, PSE has been acquiring output of the Wells Project under the  
14 Colville Slice Agreement Extension since October 1, 2021 and will continue to do  
15 so through the end of September 30, 2024 (and potentially longer depending on  
16 the ability of PSE and the Colville Tribe to reach agreement on potential future  
17 extensions).

**REDACTED VERSION**

1 **E. Involvement of PSE Management**

2 **Q. Did PSE’s Energy Management Committee approve the Colville Slice**  
3 **Agreement Extension?**

4 A. The PSE Energy Management Committee (“EMC”) is composed of five PSE  
5 officers and is responsible for approving long-term resource contracts and  
6 acquisitions. Please see the Prefiled Direct Testimony of Paul K. Wetherbee, Exh.  
7 PKW-1CT for additional discussion of the Energy Management Committee.  
8 PSE’s Energy Management Committee approved the Colville Slice Agreement  
9 Extension on February 23, 2021. Please see Exh. ZCY-4C, for the presentation to  
10 the Energy Management Committee for the Colville Slice Agreement Extension.  
11 Please see Exh. ZCY-5C for a copy of the Colville Slice Agreement Extension.

12 **F. Benefits of the Colville Slice Agreement Extension**

13 **Q. Please describe PSE’s bid price for the Colville Slice Agreement Extension.**

14 A. After analyzing the benefits of the Colville Slice Agreement Extension, PSE made  
15 an offer to extend the Colville Slice Agreement at a price that would be  
16 competitive but was less than PSE’s projected avoided energy, flexibility, and  
17 avoided carbon emission values associated with the output, thereby resulting in  
18 benefits for PSE and its customers. PSE staff negotiated a three-year extension at  
19 a cost of \$ [REDACTED] per year (about \$ [REDACTED] per MWh based on historical average  
20 water conditions).

1 **Q. What are the projected annual costs of the Colville Slice Agreement**  
2 **Extension?**

3 A. Table 2 below summarizes the projected annual costs of the Colville Slice  
4 Agreement Extension.

**Table 2. Colville Slice Annual Costs**

	2021	2022	2023	2024
Monthly Rate	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
Number of Months Under New Contract	3	12	12	9
Projected Annual Costs	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]

5 **Q. Please describe the cost of the Colville Slice Agreement Extension when**  
6 **compared to the value it adds to PSE power portfolio.**

7 A. Table 3 below compares the annual contract costs of the Colville Slice Agreement  
8 Extension to the average projected annual portfolio value in two scenarios for the  
9 cost of carbon. In both scenarios, PSE projected that the Colville Slice Agreement  
10 Extension would provide annual power portfolio benefits that exceed the annual  
11 costs of the Colville Slice Agreement Extension.

**REDACTED VERSION**

**Table 3. Summary of Annual Benefits of the Colville Slice Agreement Extension**

	<b>Market Carbon Allowance Scenario</b>	<b>Social Cost of Carbon Scenario</b>
Projected Annual Portfolio Value (Energy + Flexibility + Avoided Carbon)	[REDACTED]	[REDACTED]
Annual Contract Costs	[REDACTED]	[REDACTED]
Expected Annual Benefits	[REDACTED]	[REDACTED]

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16

**III. ACQUISITION OF THE CHELAN SLICE AGREEMENT IS PRUDENT**

**A. Background and Key Terms of the Chelan Slice Agreement**

**Q. Please describe the Rocky Reach and Rock Island Hydroelectric projects.**

A. The Rocky Reach Hydroelectric Project (“Rocky Reach Project”) is an 11-unit, 1,300 MW hydroelectric facility owned and operated by Chelan PUD and located on the Columbia River. The Rocky Reach Project began commercial operation in 1961, and its operating license expires in the year 2052.

The Rock Island Hydroelectric Project (“Rock Island Project”) is an 11-unit, 624 MW hydroelectric facility also owned and operated by Chelan PUD and located on the Columbia River. The Rock Island Project began commercial operation in 1932, and its operating license expires in the year 2028.

The Rocky Reach and Rock Island Projects are currently used to serve local load of Chelan PUD in Chelan County, and Chelan PUD sells surplus energy to third parties under existing power purchase agreements. PSE has a long history with



1 both projects, dating back to the construction of the Rock Island Project. PSE  
2 purchases a 25 percent share (approximately 480 MW of capacity) of the output  
3 of both the Rocky Reach and Rock Island Projects. PSE's existing agreement with  
4 Chelan PUD expires in accordance with its terms in 2031.

5 **Q. Please describe the key terms of the Chelan Slice Agreement.**

6 A. The Chelan Slice Agreement is a new five-year contract for a share of the output  
7 of the Rocky Reach and Rock Island Projects offered by Chelan PUD to PSE  
8 through a competitive auction process in 2021. Chelan PUD selected PSE as the  
9 winning bidder in March 2021, and PSE and Chelan PUD subsequently executed  
10 the Chelan Slice Agreement on March 31, 2021.

11 The Chelan Slice Agreement has a term that begins on January 1, 2022 and  
12 expires on December 31, 2026. The Chelan Slice Agreement entitles PSE to  
13 receive a five percent (5%) share of the output of the Rocky Reach and Rock  
14 Island Projects. When paired with PSE's existing transmission rights, the Chelan  
15 Slice Agreement provides approximately (i) 95 MW of dispatchable and flexible  
16 capacity, (ii) [REDACTED] MWh of storage, and (iii) [REDACTED] MWh of clean, zero-emission  
17 power to contribute toward PSE's resource needs.<sup>14</sup> PSE negotiated a fixed price  
18 of \$ [REDACTED] for the five-year term, paid in equal monthly amounts of about

[REDACTED VERSION]

<sup>14</sup> Based on an average of 80 years of hydrological history.

1 \$ [REDACTED]. This fixed price represents an hourly price of approximately \$ [REDACTED] per  
2 MWh, assuming historical average water conditions.

3 **B. Need for the Chelan Slice Agreement**

4 **Q. Please describe the need for the Chelan Slice Agreement.**

5 A. Similar to the Colville Slice Agreement Extension, the Chelan Slice Agreement is  
6 a fixed price contract that allows PSE to meet a portion of the firm resource  
7 adequacy-qualifying contract needs identified in the 2021 Integrated Resource  
8 Plan. PSE currently relies on up to 1,500 MW of short-term market purchases to  
9 meet its capacity need. The Chelan Slice Agreement will replace approximately  
10 95 MW of short-term market purchases and reduce the risk of uncertain resource  
11 availability.

12 The Chelan Slice Agreement also allows PSE to acquire a valuable hydroelectric  
13 resource at a time when PSE is entering into the CETA compliance period.<sup>15</sup>

14 Finally, the Chelan Slice Agreement increases PSE's access to some of the  
15 region's most valuable and scarce hydroelectric resources. The flexibility and  
16 emission-free nature of the output of the Rocky Reach and Rock Island Projects  
17 will provide valuable qualitative and quantitative benefits to PSE and its  
18 customers over the life of the Chelan Slice Agreement and any potential  
19 extensions.

<sup>15</sup> Chapter 19.405 RCW.

SHADED INFORMATION IS  
DESIGNATED AS CONFIDENTIAL PER  
WAC 480-07-160

1 **Q. What would have been the risk if PSE had chosen not to execute the Chelan**  
2 **Slice Agreement when it was awarded in March 2021?**

3 A. If PSE had not executed the Chelan Slice Agreement in March 2021, PSE would  
4 have risked losing the opportunity to acquire a valuable non-emitting, flexible  
5 capacity resource to another off-taker through the Chelan PUD's competitive  
6 auction process. In late 2020, Chelan PUD notified PSE that it would be  
7 conducting an auction to sell a share, or "slice", of the Rocky Reach and Rock  
8 Island Projects. Chelan PUD holds periodic auctions to sell surplus power from  
9 their generation projects. Prior to the auction in March 2021, the last Chelan PUD  
10 auction had taken place in 2019. PSE participated in the 2019 auction but was not  
11 the winning bidder. PSE chose to participate in the Chelan PUD auction in  
12 March 2021, and its offer was selected as the winning bid.

13 Executing the Chelan Slice Agreement in March 2021 secured this highly  
14 valuable hydroelectric resource for PSE's portfolio through December 31, 2026.

15 The Chelan Slice Agreement offers a significant amount of emission-free dispatch  
16 capacity at a time when PSE is seeking resources that will help it improve  
17 reliability and reduce emissions.

1 **C. Comparison of the Chelan Slice Agreement to Alternatives**

2 **Q. What alternatives did PSE consider in its analysis of the Chelan Slice**  
3 **Agreement?**

4 A. Chelan PUD marketed the Chelan Slice Agreement through a competitive auction  
5 that closed in March 2021. Therefore, PSE had a limited window in which to  
6 make a decision about whether to submit an offer to compete for the Chelan Slice  
7 Agreement and subsequently enter into the agreement with Chelan PUD.

8 The limited window of opportunity to consider the Chelan Slice Agreement  
9 concluded prior to PSE issuing its 2021 RFP on June 30, 2021. This prevented  
10 PSE from evaluating the Chelan Slice Agreement as part of its competitive  
11 2021 RFP process. To accommodate the accelerated schedule, PSE compared the  
12 Chelan Slice Agreement to short-term market purchase alternatives.

13 **Q. Describe PSE's approach to analyzing the value of the Chelan Slice**  
14 **Agreement.**

15 A. Similar to the process described above for the analysis of the Colville Slice  
16 Agreement Extension, PSE analyzed the value of the Chelan Slice Agreement by  
17 calculating the total portfolio cost differential between:

- 18 • The existing portfolio without the Chelan Slice Agreement;  
19 and
- 20 • The existing portfolio with the Chelan Slice Agreement.

1 Similar to the process described above for the analysis of the Colville Slice  
2 Agreement Extension, PSE grouped the total portfolio benefits of the Chelan Slice  
3 Agreement based on (1) Avoided Energy Value, (2) Flexibility Value, and (3)  
4 Avoided Carbon Emission Value.

5 PSE calculated these three value streams for 2022 and applied each of the values  
6 to the forward energy prices during the term of the Chelan Slice Agreement to  
7 calculate the projected total value of the Chelan Slice Agreement to PSE.

8 **Q. Please describe the model PSE used to perform the analysis of the Chelan**  
9 **Slice Agreement.**

10 A. In analyzing the Chelan Slice Agreement, PSE updated the forecasted forward  
11 energy prices but otherwise used the same models, assumptions, and  
12 methodologies previously described for the Colville Slice Agreement Extension.

13 **Q. Please describe the key assumptions PSE used in the analysis of the Chelan**  
14 **Slice Agreement.**

15 A. Key inputs used by PSE in the analysis include: (i) PSE's existing resource  
16 portfolio, (ii) a forecast of forward power prices, (iii) the projected output  
17 provided under the Chelan Slice Agreement, and (iv) a forecast of forward carbon  
18 prices.

1 **Q. Please describe the forecast of forward power prices assumed by PSE for**  
2 **analysis of the Chelan Slice Agreement.**

3 A. PSE used the flat monthly forward mark provided by Platts published on March  
4 15, 2021. Platts is a service that provides forward prices based on Intercontinental  
5 Exchange settlement data. Next, PSE used the most recent available historical  
6 2020 hourly spot power prices to shape the flat monthly price forward price  
7 forecast. This shaping is done by taking the flat 2020 price by month and indexing  
8 each hourly price in the month to the average price, then applying the Platts  
9 forward mark to this index to develop a realistic hourly power price forecast for  
10 the evaluation. Finally, PSE used the power price forecast over the five-year term  
11 of the Chelan Slice Agreement to estimate the future value of the energy  
12 displaced by the contract.

13 **Q. Please describe the projected output assumed by PSE for analysis of the**  
14 **Chelan Slice Agreement.**

15 A. PSE forecasted a monthly volume forecast for the Chelan Slice Agreement based  
16 on the average of historical 80-year monthly hydro volumes for the Rock Island  
17 and Rocky Reach Projects. PSE then created a proxy daily volume by shaping the  
18 monthly Rocky Reach and Rock Island project volumes to a daily volume based  
19 on recent historical daily output data from BPA's Chief Joseph Hydro Project.  
20 PSE input the daily volume into the Plexos model for hourly commitment and  
21 dispatch optimization.

1 **Q. Please describe the projected value of avoided carbon emissions used by PSE**  
2 **for analysis of the Chelan Slice Agreement.**

3 A. For the analysis of the Chelan Slice Agreement, PSE used the same projected  
4 value of avoided carbon emissions that PSE used for analysis of the Colville Slice  
5 Agreement Extension as discussed in Section II.C of this prefiled direct  
6 testimony.

7 **Q. Please summarize the results of the evaluation of the Chelan Slice**  
8 **Agreement.**

9 A. Table 4 below present the results of the valuation of the Chelan Slice Agreement.

10 **Table 4. Summary of Value Streams**  
11 **for the Chelan Slice Agreement**

Value Streams	Scenario 1	Scenario 2
Energy Value	[REDACTED]	[REDACTED]
Flexibility Value	[REDACTED]	[REDACTED]
Avoided Carbon Emissions	[REDACTED]	[REDACTED]
Energy + Flexibility + Avoided Carbon Emissions (\$/MWh)	[REDACTED]	[REDACTED]
Annual Estimate Value (\$/MWh x Annual MWh)	[REDACTED]	[REDACTED]

[REDACTED VERSION]

12 See also Exh. ZCY-3C for a summary of the analyses PSE performed to estimate  
13 the value of Chelan Slice Agreement.

1 **D. The Chelan Slice Agreement is Used and Useful**

2 **Q. Is the Chelan Slice Agreement used and useful?**

3 A. Yes. As previously discussed, the term of the Chelan Slice Agreement began on  
4 January 1, 2022 and will expire in accordance with its terms at the end of  
5 December 31, 2026. Accordingly, PSE has been acquiring output of the Rocky  
6 Reach and Rock Island Projects under the Chelan Slice Agreement since  
7 January 1, 2022 and will continue to do so through the end of December 31, 2026.

8 **E. Involvement of PSE Management**

9 **Q. Did PSE's Energy Management Committee approve the Chelan Slice**  
10 **Agreement?**

11 A. Yes. PSE's Energy Management Committee approved the Chelan Slice  
12 Agreement on March 25, 2021. Please see Exh. ZCY-4C for the presentation to  
13 the Energy Management Committee for the Chelan Slice Agreement. Please see  
14 also Exh. ZCY-5C for a copy of the Chelan Slice Agreement.

15 **F. Benefits of the Chelan Slice Agreement**

16 **Q. Please describe PSE's bid price for the Chelan Slice Agreement.**

17 A. After analyzing the benefits of the Chelan Slice Agreement, PSE made an offer to  
18 enter into the Chelan Slice Agreement at a price that would be competitive but  
19 was less than PSE's projected avoided energy, flexibility, and avoided carbon



1 emission values associated with the output, thereby resulting in benefits for PSE  
2 and its customers. PSE staff submitted a bid for a five-year term at a cost of  
3 \$ [REDACTED] per year (about \$ [REDACTED] per MWh based on historical average water  
4 conditions).

5 **Q. What are the projected annual costs of the Chelan Slice Agreement?**

6 A. Table 5 below summarizes the projected annual costs of the Chelan Slice  
7 Agreement.

**Table 5. Chelan Slice Annual Costs**

	2022	2023	2024	2025	2026
Projected Annual Costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

8 **Q. Please describe the cost of the Chelan Slice Agreement when compared to the**  
9 **value it adds to PSE power portfolio.**

10 A. Table 6 below compares the annual contract costs of the Chelan Slice Agreement  
11 to the average projected annual power portfolio value in two scenarios for the cost  
12 of carbon. In both scenarios, PSE projected that the Chelan Slice Agreement  
13 would provide annual power portfolio benefits that exceed the annual costs of the  
14 Chelan Slice Agreement.

**REDACTED VERSION**

**Table 6. Summary of Annual Benefits of the Chelan Slice Agreement**

	<b>Market Carbon Allowance Scenario</b>	<b>Social Cost of Carbon Scenario</b>
Projected Annual Portfolio Value (Energy + Flexibility + Avoided Carbon)	[REDACTED]	[REDACTED]
Annual Contract Costs	[REDACTED]	[REDACTED]
Expected Annual Benefits	[REDACTED]	[REDACTED]

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15

**IV. CONCLUSION**

**Q. Please summarize your prefiled direct testimony.**

A. When paired with PSE’s Mid-C transmission rights, each of the Colville Slice Agreement Extension and the Chelan Slice Agreement will (i) enhance PSE’s resource portfolio, (ii) help reduce PSE’s reliance on short-term market purchases, and (iii) strengthen its relationships with counterparties for future negotiations. Additionally, each of the Colville Slice Agreement Extension and the Chelan Slice Agreement replaces unspecified short-term market purchases with specific hydroelectric resources and includes benefits such as avoided carbon emissions and flexible capacity. PSE has included these benefits in its evaluation in each of the agreement in the analyses previously described. PSE seeks a determination of prudence and cost recovery for each of the Colville Slice Agreement Extension and the Chelan Slice Agreement.

**Q. Does that conclude your prefiled direct testimony?**

A. Yes, it does.

SHADED INFORMATION IS  
DESIGNATED AS CONFIDENTIAL PER  
WAC 480-07-160

REDACTED VERSION