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May 20, 2020

VIA ELECTRONIC FILING

Diane Hanian, Secretary
Idaho Public Utilities Commission
11331 W. Chinden Boulevard
Building 8, Suite 201-A
Boise, Idaho 83714

Re: Case No. IPC-E-19-18
Validation of North Valmy Power Plant Unit 2 Closure in 2025
Idaho Power Company's Testimony

Dear Ms. Hanian:

Attached for electronic filing in the above matter is Idaho Power Company's Supplemental Direct Testimony of Tom Harvey.

If you have any questions about the enclosed documents, please do not hesitate to contact me.

Very truly yours,

Lisa D. Nordstrom

Lisa D. Nordstrom

LDN:sdh
Enclosures

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF IDAHO POWER COMPANY'S APPLICATION FOR A DETERMINATION VALIDATING A NORTH VALMY POWER PLANT UNIT 2 CLOSURE IN 2025.	)	CASE NO. IPC-E-19-18

IDAHO POWER COMPANY

SUPPLEMENTAL DIRECT TESTIMONY

OF

TOM HARVEY

Q. Please state your name, business address, and present position with Idaho Power Company ("Idaho Power" or "Company").

A. My name is Tom Harvey and my business address is 1221 West Idaho Street, Boise, Idaho 83702. I am employed by Idaho Power as the Vice President of Power Supply in the Power Supply Department.

Q. Have you previously submitted testimony before the Idaho Public Utilities Commission ("Commission") in this proceeding?

A. Yes. On June 27, 2019, I filed testimony presenting the results of the Valmy Unit 2 closure analyses supporting a December 31, 2025, end-of-life date and requesting the Commission acknowledge the Company has sufficiently validated the economic retirement date of Unit 2 is December 31, 2025, as directed by the Commission in Order No. 34349.

Q. What is the purpose of your testimony in this case?

A. The purpose of my testimony is to present additional validation that the economic retirement date of Valmy Unit 2 is December 31, 2025, based on the analyses performed during and after the development of the Amended 2019 Integrated Resource Plan ("IRP") filed with the Commission on January 31, 2020, as directed by the

Commission in Order No. 34349. The additional analyses performed using the results of the Amended 2019 IRP validate the conclusions found in the initial analysis presented in my direct testimony. The results indicate that, under the broad range of modeled scenarios, an exit from Unit 2 prior to 2025 would result in higher costs for customers and would cause system reliability concerns. The analyses validate year-end 2025 as the appropriate end-of-life date for Valmy Unit 2.

Q. Do you have any exhibits?

A. Yes. Exhibit No. 1 to my testimony presents the net present value ("NPV") difference between the cost of the Preferred Portfolio and the portfolios modeled during the Company's supplemental analyses discussed later in my testimony. Exhibit No. 2 illustrates the results of the Frequency Duration Loss of Load evaluation performed.

I. THE AMENDED 2019 IRP

Q. Please describe what led to the filing of the Amended 2019 IRP.

A. As mentioned in my direct testimony filed in June 2019, Idaho Power used the Long-Term Capacity Expansion ("LTCE") modeling capability of AURORA to produce Western Electricity Coordinating Council- ("WECC") optimized portfolios under various future conditions. Specifically, the AURORA LTCE modeling was performed using

three natural gas forecasts and four carbon emissions adders, with the Boardman-to-Hemingway transmission line project ("B2H") and without.

The result was 24 separate portfolios, all with a Valmy Unit 2 shutdown date of 2025, that included varied amounts of nameplate generation additions, creating a diversity of resource mixes. While retiring Valmy Unit 2 prior to 2025 was an option available for selection within the logic of the LTCE model, none of the 24 portfolios included an early retirement of this unit. When analyzing the portfolio results as part of a different case filed by the Company, Idaho Power discovered an issue within the logic of the LTCE modeling in AURORA that warranted further investigation.

Q. What concerns did the Company have with the logic built into the LTCE modeling of AURORA?

A. It was determined that while optimizing resource build-out portfolios for the WECC region, of which Idaho Power's balancing authority is part, AURORA appeared to be modifying the resource timing of the Company's resources to the benefit of the WECC. While optimizing and reducing costs for the WECC region, the Company was concerned that the results did not reflect the least cost portfolio for Idaho Power and its customers.

Q. How did the Company address this issue with the LTCE modeling logic?

A. To ensure the final preferred portfolio was optimized for Idaho Power, the Company manually modified a subset of the top-performing WECC-optimized portfolios to arrive at the least-cost, least risk portfolio specific to Idaho Power. Through this process, the annual level of reserves on the system was evaluated and resource additions and retirements were modified to determine if a more economically optimal result could be achieved. Extra attention was given to the Jim Bridger Coal Plant ("Bridger") to ensure the shutdown dates of these units were developed to yield the best possible economic and reliability outcome for the Company and its customers.

II. SUPPLEMENTAL VALMY UNIT 2 CLOSURE ANALYSES

Q. Did the manual modification result in any changes to the Valmy Unit 2 shutdown date of 2025?

A. No. The logic of the capacity expansion model allowed Unit 2 to retire in 2025 or earlier. In all 24 LTCE scenarios, Unit 2 did not shut down prior to 2025. In fact, the manual modification resulted in only two changes to Idaho Power's preferred portfolio: the removal of a solar resource no longer available and the shift of demand response procurement to later in the planning period. There were no changes associated with any coal-fired generating

units within the action plan window; the portfolios continue to indicate favorable economics associated with the exit of five of seven units by 2026.

Q. Did the Company perform any additional analyses of the portfolio results to further validate the Unit 2 2025 shutdown date?

A. Yes. Given the concerns around the LTCE model's ability to fully optimize for Idaho Power's specific system, additional analysis was performed to further validate that year-end 2025 is the optimal exit date from Valmy Unit 2 for Idaho Power and its customers. To accomplish this, Idaho Power performed a comprehensive analysis[1] to further validate the Unit 2 2025 shutdown date, comparing the NPV differences between the portfolio costs of the amended IRP portfolios with a series of alternative futures, including:

- a Valmy Unit 2 shutdown of 2024 under planning natural gas and planning CO2 cost assumptions,
- a Valmy Unit 2 shutdown of 2023 under planning natural gas and planning CO2 cost assumptions,

[1] The analysis presented in this testimony was initially performed in response to discovery from Commission Staff ("Staff") issued in this case. Therefore, the figures presented herein reflect those provided to parties through the discovery process.

- a Valmy Unit 2 shutdown of 2024 under planning natural gas and high CO2 cost assumptions,
- a Valmy Unit 2 shutdown of 2023 under planning natural gas and high CO2 cost assumptions,
- a Valmy Unit 2 shutdown of 2024 under planning natural gas and planning CO2 cost assumptions but without B2H,
- a Valmy Unit 2 shutdown of 2023 under planning natural gas and planning CO2 cost assumptions but without B2H,
- a Valmy Unit 2 shutdown of 2024 under planning natural gas and high cost CO2 assumptions but without B2H, and
- a Valmy Unit 2 shutdown of 2023 under planning natural gas and high CO2 cost assumptions but without B2H.

As can be seen in the results of this analysis, presented on Exhibit No. 1, under seven of the eight scenarios, the Preferred Portfolio reflected a lower NPV than the portfolios with an exit of Valmy Unit 2 prior to 2025. Further, in all scenarios, the early exit from Valmy Unit 2 resulted in a reserve margin deficit in at least one year prior to 2025 without available capacity from Unit 2. Planning margin, a commonly-used North American Electric Reliability Corporation reliability indicator (M-1 Reserve

Margin), is used to ensure reliable system operation in the future and is intended to account for NERC reliability requirements[2], load variability and loss of system elements that may reduce the capability of existing generation resources to serve demand.

Q. You mentioned earlier that the IRP analyzed three different gas price forecasts and four potential carbon adders. Why did the Company only analyze a subset of these futures in the current analysis?

A. The subset of future scenarios modeled in this case appropriately tests the viability of earlier shutdown dates for Valmy Unit 2 because the scenarios apply conditions under which it would be most beneficial to accelerate the retirement of a coal unit, i.e. scenarios in which the cost of a different fuel (natural gas) is low, and the cost of running coal facilities is highest due to the high CO2 cost assumptions. Therefore, if it is not beneficial to accelerate the exit from Valmy Unit 2 under these scenarios, it is highly unlikely that a different modeled future would yield a different result.

Q. What is the NPV difference between the cost of the Preferred Portfolio and the portfolios under planning natural gas and planning CO2 cost assumptions and with B2H?

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[2] BAL-002-WECC-1

A. As can be seen on Line 1 of Exhibit No. 1, the NPV of the Preferred Portfolio is $758,000 less than the NPV of a portfolio using a Valmy Unit 2 shutdown of 2024 and $1,016,000 less than a portfolio using a Valmy Unit 2 shutdown of 2023 under planning natural gas and planning CO2 assumptions and including B2H.

Q. What is the NPV difference between the cost of the Preferred Portfolio and the portfolios under planning natural gas and high CO2 cost assumptions and with B2H?

A. The NPV of the Preferred Portfolio is $1,107,000 less than the NPV of a portfolio using a Valmy Unit 2 shutdown of 2024 and $724,000 less than a portfolio using a Valmy Unit 2 shutdown of 2023 under planning natural gas and high CO2 assumptions and including B2H. These results can be found on Line 2 of Exhibit No. 1.

Q. Excluding B2H, what is the NPV difference between the cost of the Preferred Portfolio and the portfolios under planning natural gas and planning CO2 cost assumptions?

A. The NPV of the Preferred Portfolio is $941,000 less than the NPV of a portfolio using a Valmy Unit 2 shutdown of 2024 under planning natural gas and planning CO2 assumptions but without B2H, while the NPV of the Preferred Portfolio is $638,000 greater than a portfolio using a Valmy Unit 2 shutdown of 2023, as presented on Line

3 of Exhibit No. 1. It should be noted, however, that the cost of mitigating the reliability violations created by the shutdown of Unit 2 in 2023 under this scenario totaled approximately $40 million under the planning gas, planning carbon scenario, as detailed later in my testimony.

Q. Excluding B2H, what is the NPV difference between the cost of the Preferred Portfolio and the portfolios under planning natural gas and high CO2 cost assumptions?

A. The NPV of the Preferred Portfolio is $1,103,000 less than the NPV of a portfolio using a Valmy Unit 2 shutdown of 2024 and $223,000 less than a portfolio using a Valmy Unit 2 shutdown of 2023 under planning natural gas and high CO2 assumptions but excluding B2H. Please see Exhibit No. 1, Line 4 for the detailed results.

Q. You indicated that in all scenarios the early exit from Valmy Unit 2 resulted in reliability violations in at least one year prior to 2025 without the available capacity from Unit 2. What was the resulting impact to the planning margin?

A. In all eight of the scenarios described earlier and performed as part of the comprehensive LTCE analysis, a planning margin shortfall occurred in either 2024 or 2025. A drop below the 15 percent planning margin

results in the need to delay the exit of a Bridger coal unit or accelerate the need for another resource.

Q. Did Idaho Power perform any further analysis to address the planning margin shortfall?

A. Yes. Idaho Power performed an additional analysis to ensure that a more optimal result could not be attained by accelerating the shutdown of Valmy Unit 2 and addressing the resulting planning margin shortfall with a different resource decision.

Q. Please describe this analysis.

A. The Company utilized a delay in the exit of a Bridger coal unit to address the planning shortfall created by the early exit of Valmy Unit 2 prior to 2025. Because the reliability violations occurred prior to 2026, Idaho Power did not differentiate between the scenarios that included B2H and those that do not, as the modeling changes specific to the timing differences associated with exiting from Valmy Unit 2 prior to 2025 and delaying the first Bridger unit exit are captured prior to the in-service date of B2H.

Q. What were the results of the reliability mitigation analysis?

A. The results of the reliability mitigation analysis are presented on Lines 5 and 6 of Exhibit No. 1. As can be seen, a delay in the exit of a Bridger coal unit

to accelerate the exit of Valmy Unit 2 resulted in significantly higher portfolio costs. The NPV of the Preferred Portfolio is $29.22 million less than the NPV of a portfolio using a Valmy Unit 2 shutdown of 2024 and $29.43 million less than a portfolio using a Valmy Unit 2 shutdown of 2023 under planning natural gas and planning CO2 cost assumptions. Under planning natural gas and high CO2 cost assumptions, the NPV of the Preferred Portfolio is $26.24 million less than the NPV of a portfolio using a Valmy Unit 2 shutdown of 2024 and $25.44 million less than a portfolio using a Valmy Unit 2 shutdown of 2023.

Q. Did the Company evaluate the construction of another resource rather than the delay of a Bridger unit exit to mitigate the reliability issues caused by an early Valmy Unit 2 exit?

A. Yes. However, because the planning margin shortfall occurs as early as 2024, resource procurement rules and construction timeframes would prevent the addition of any supply-side resources in that amount of time. A movement in the exit date from a Bridger unit is the next best option for meeting load if Valmy Unit 2 was shutdown prior to 2025.

Q. To what resource procurement rules is Idaho Power subject?

A. Under the Oregon rules governing Resource Procurement for Electric Utilities, which are applicable to Idaho Power in its Idaho jurisdiction, the Company estimates that the entire process to procure and construct additional generation would take a minimum of approximately 6 years. In Case No. IPC-E-10-03, the Idaho Commission directed Idaho Power in Order No. 32745 to comply with resource procurement rules applicable in its Oregon service area, "should the Company commence an RFP process for a new supply-side resource prior to the development of Idaho-specific RFP guidelines." These rules would hinder the Company's ability to have available a supply-side resource prior to 2024. Consequently, the Company does not believe acquisition of an additional supply-side resource is a practical option given the timing of the resource deficiency.

Q. Did the Company consider demand response as a viable option for mitigating the reliability impacts of an early Valmy Unit 2 shutdown?

A. Demand response is considered a resource that is able to meet peak demand and, as such, is factored into Idaho Power's 15 percent peak planning margin. However, demand response is not a resource able to broadly address reliability constraints or reserve requirements. Contingency events can occur any time throughout the year.

The 390 MW of demand response on Idaho Power's system is only available in the summer during specific hours.

Q. How did the Company determine specifically when the reserve margin deficits occurred?

A. Idaho Power performed a Frequency Duration Loss of Load evaluation to determine when resources are required to address reserve margin deficits. The evaluation included 100 iterations of the year 2025 from the preferred portfolio with a Valmy Unit 2 exit modeled in 2023. The results are included as Exhibit No. 2 to my testimony with the hours in which current demand response programs are available shaded. As can be seen, a large number of the loss of load events occur during non-peak hours for which current demand response programs are unavailable.

Q. Please summarize the results of the additional validation performed by the Company that the economic retirement date of Valmy Unit 2 is December 31, 2025.

A. The additional comprehensive analysis performed by Idaho Power to validate the Unit 2 shutdown date compared the net present value differences between the portfolio costs of the amended IRP portfolios with a series of alternative futures, and further resolved any planning margin shortfalls created by a shutdown of Valmy Unit 2 before 2025 by delaying the exit of a Bridger unit. Under seven of the eight scenarios, the Preferred Portfolio

reflected a lower NPV than the portfolios with the exit of Valmy Unit 2 prior to 2025. In addition, in all eight scenarios, the early exit from Valmy Unit 2 resulted in reliability violations without available capacity from Unit 2. Lastly, delaying the exit of a Bridger unit to meet the planning margin shortfalls resulted in significantly higher portfolio costs than the Preferred Portfolio.

III. CONCLUSION

Q. What conclusions can be drawn from these results?

A. As directed by the Commission in Order No. 34349, Idaho Power performed Unit 2 closure analyses as part of the 2019 IRP process. The additional analyses performed using the results of the Amended 2019 IRP validate the conclusions found in the initial analysis presented in my direct testimony. The results indicate that, under the broad range of modeled scenarios, an exit from Unit 2 prior to 2025 would result in higher costs for customers and would cause system reliability concerns. The analyses validate year-end 2025 as the appropriate end-of-life date for Valmy Unit 2.

Q. Does this complete your testimony?

A. Yes, it does.

DECLARATION OF TOM HARVEY

I, Tom Harvey, declare under penalty of perjury under the laws of the state of Idaho:

1. My name is Tom Harvey. I am employed by Idaho Power Company as the Vice President of Power Supply in the Power Supply Department.

2. On behalf of Idaho Power, I present this pre-filed supplemental direct testimony and Exhibit Nos. 1-2 in this matter.

3. To the best of my knowledge, my pre-filed supplemental direct testimony and exhibits are true and accurate.

I hereby declare that the above statement is true to the best of my knowledge and belief, and that I understand it is made for use as evidence before the Idaho Public Utilities Commission and is subject to penalty for perjury.

SIGNED this 22nd day of May 2020, at Boise, Idaho.

Tom J. Harvey

BEFORE THE

IDAHO PUBLIC UTILITIES COMMISSION

CASE NO. IPC-E-19-18

IDAHO POWER COMPANY

HARVEY, SUPP DI TESTIMONY

EXHIBIT NO. 1

Valmy Unit 2 Closure Supplemental Analysis

Line	Scenario	Preferred Portfolio Cost (NPV) x $1000	Portfolio Cost (NPV) x $1000		Difference x $1000	
	Alternative Futures	Valmy Unit 2 Exit: 2025	Valmy Unit 2 Exit: 2024	Valmy Unit 2 Exit: 2023	Valmy Unit 2 Exit: 2024	Valmy Unit 2 Exit: 2023
1	Planning Gas / Planning CO2	$ 6,134,504	$ 6,135,262	$ 6,135,520	$ 758	$ 1,016
2	Planning Gas / High CO2	$ 8,100,758	$ 8,101,865	$ 8,101,481	$ 1,107	$ 724
3	Planning Gas / Planning CO2; Excluding B2H	$ 6,233,683	$ 6,234,624	$ 6,233,045	$ 941	$ (638)
4	Planning Gas / High CO2; Excluding B2H	$ 7,946,693	$ 7,947,797	$ 7,946,916	$ 1,103	$ 223
	Utilizing Bridger to Address Planning Shortfall					
5	Planning Gas / Planning CO2	$ 6,134,504	$ 6,163,725	$ 6,163,932	$ 29,221	$ 29,428
6	Planning Gas / High CO2	$ 8,100,758	$ 8,126,996	$ 8,126,195	$ 26,238	$ 25,437

BEFORE THE

IDAHO PUBLIC UTILITIES COMMISSION

CASE NO. IPC-E-19-18

IDAHO POWER COMPANY

HARVEY, SUPP DI TESTIMONY

EXHIBIT NO. 2

FREQUENCY DURATION LOSS OF LOAD EVALUATION

Preferred Portfolio with a Valmy Unit 2 Exit in 2023
Year: 2025

LOL Frequency by Hour of Day		
Hour	Count (Hours)	LOL Percentage by Hour
1:00 AM	4	2.9%
2:00 AM	5	3.6%
3:00 AM	2	1.4%
4:00 AM	1	0.7%
10:00 AM	2	1.4%
11:00 AM	6	4.3%
12:00 PM	6	4.3%
1:00 PM	5	3.6%
2:00 PM	6	4.3%
3:00 PM	6	4.3%
4:00 PM	11	8.0%
5:00 PM	12	8.7%
6:00 PM	12	8.7%
7:00 PM	9	6.5%
8:00 PM	9	6.5%
9:00 PM	13	9.4%
10:00 PM	11	8.0%
11:00 PM	11	8.0%
12:00 AM	7	5.1%
Total	138	100.0%

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Attorney for Idaho Power Company

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION OF IDAHO POWER FOR A VALIDATED ECONOMIC CLOSURE DATE FOR NORTH VALMY POWER PLANT UNIT 2	CASE NO. IPC-E-19-18 IDAHO POWER COMPANY'S CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on this 22nd day of May 2020, I served a true and correct copy of the within and foregoing IDAHO POWER COMPANY'S SUPPLEMENTAL DIRECT TESTIMONY OF TOM HARVEY upon the following named parties by the method indicated below, and addressed to the following:

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