PACIFIC POWER
A DIVISION OF PACIFICORP

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March 3, 2022

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
201 High Street SE, Suite 100
Salem, OR 97301-3398

Attn: Filing Center

RE: LC 77—Response to ALJ Bench Requests 1 through 7

Pursuant to Administrative Law Judges (ALJ) Rowe's and ALJ Mapes' Ruling of February 17, 2022, enclosed for filing in this docket are the Responses to ALJ Bench Request Nos. 1, 6, and 7 and Attachments 1-5 and 7-2. Provided via BOX are Confidential Responses Bench Request 1 and 6 and Confidential Attachments Bench Request 1-1, 1-2, 1-3, 1-4, 1-6, and 7-1.

Confidential information is designated as Protected Information under the protective order in this proceeding and may only be disclosed to qualified persons as defined in that order.

Please direct any questions regarding this filing to Cathie Allen at (503) 813-5934.

Sincerely,

Shelley McCoy

Shelley McCoy
Director, Regulation

Enclosures

ALJ Bench Request 1

Staff Recommendation #7, Sensitivity Removing Take or Pay Assumptions: For the results of PacifiCorp's sensitivity that removes any take or pay assumptions in PLEXOS in any years after there is an existing contract:

(a) Compare the level of dispatch of each thermal plant and other resource types in the sensitivity versus the preferred portfolio.

(b) Report the fuel cost savings at Jim Bridger 3 and 4 by year.

(c) Explain when Jim Bridger 3 and 4 provide the highest value: *i.e.,* which months and hours have the highest capacity value and what is that capacity value?

(d) Explain when in the year (which hours and months or which system conditions) the reliability of the system requires the full output of the Jim Bridger units in key years, such as in 2025, after the 2020 All-Source Request for Proposal (2020AS RFP) final shortlist resources have come online.

Confidential Response to ALJ Bench Request 1

Referencing the Public Utility Commission of Oregon (OPUC) staff's Final Comments Report dated February 11, 2022, specifically, OPUC staff's requested sensitivity removing take-or-pay assumptions as discussed on pages 9 through 13, the Company responds as follows:

The Company notes that while OPUC staff's requested sensitivity is ultimately concerned with the inclusion of Jim Bridger minimum take assumptions in the 2021 Integrated Resource Plan (IRP) preferred portfolio, the 2021 IRP preferred portfolio is not the appropriate study for comparison. The study design in development leading up to OPUC staff's Final Comments used P02-MM rather than the 2021 IRP preferred portfolio for reasons which OPUC staff articulates and finds reasonable on page 13 of their Final Comments Report, which states "Staff finds that, if the intent is to make sure that each state is assigned the costs associated with its legislative requirements instead of sharing costs of state-specific policy among jurisdictions, then this response is reasonable". The Company also notes that OPUC staff's sensitivity requested additional endogenous modeling of coal retirement options for Jim Bridger Unit 3 and Jim Bridger Unit 4, Huntington Unit 1 and Huntington Unit 2, and Naughton Unit 1 and Naughton Unit 2.

With the foregoing understanding and clarification, the Company responds as follows:

(a) In the 2021 IRP, PLEXOS long-term (LT) modeling selected Jim Bridger Unit 3 and Jim Bridger Unit 4 to run and generate energy that included fuel take-or-pay obligations through end-of-life. In the requested Oregon sensitivity, which allows for additional endogenous retirement options and removes fuel take-or-pay obligations,

PLEXOS LT optimization of the P02-MM study continues to select Jim Bridger Unit 3 and Jim Bridger Unit 4 to run on coal and generate energy through the existing end-of-life in 2037. PLEXOS considers the early retirement of Jim Bridger Unit 3 and Jim Bridger Unit 4 incurring accelerated decommissioning costs and incurring replacement resources costs to be unfavorable to customers.

In the Oregon sensitivity outcome, the operation of Jim Bridger Unit 3 and Jim Bridger Unit 4 through 2037 provide quantifiable and valuable risk mitigation to the system. This is especially apparent in the timeframe 2030 and beyond. Results of the medium-term (MT) stochastic model demonstrate that volatility pushes both units to operate in all years in 96 percent of all stochastic iterations, generating energy to cover variations in load, hydro, electric prices, natural gas prices and outages in order to address system risk. The value of this risk mitigation to the system is brought into the short-term (ST) deterministic results through the risk-adjustment, contributing to the risk-adjusted present value of revenue requirements (PVRR) used to rank competing outcomes.

While the models continue to indicate the value of Jim Bridger Unit 3 and Jim Bridger Unit 4's ongoing operation, there is additional benefit if the modeling assumes there will be "complete fueling freedom", i.e. that there will be no contractual obligations of any kind for future fueling beyond current contracts. This additional benefit assumes adequate and reliable coal supply would be available on demand, and that this fuel supply could be achieved without significant capital to retrofit the plant for the safe delivery and handling of large volumes of Powder River Basin (PRB) coal to replace the existing coal supply. This is an unrealistic scenario as coal suppliers require some assurance that the supplier can cover the costs to produce the coal and maintain an adequate workforce, which is typically done through minimum take-or-pay provisions in a contract. With this unconstrained assumption, there are no retirement changes and limited resource changes in years 2030 and beyond; however, complete fueling freedom generates a net system benefit of $156 million present value of revenue requirements differential (PVRR(d)) when compared to top performing case P02-MM.

Studies to determine the additional capital investment at Jim Bridger to enable deliveries of sufficient PRB coal to fuel the plant were calculated in the last Jim Bridger Long-Term Fuel Plan. The studies conducted in 2018, and refreshed in 2019, estimated that [redacted]

Because the Oregon sensitivity portfolio continues to include Jim Bridger Unit 3 and Jim Bridger Unit 4 through end-of-life, one important impact of this outcome is that it indicates a reduction in cost in the P02-MM, assuming only small changes, of an additional $156 million. This significantly increases the system benefit of P02-MM when compared to the P02h variant (where Jim Bridger Unit 3 and Jim Bridger Unit 4 are retired early). The $60 million in P02-MM benefits may rise as high as $216 million in simple PVRR(d), which would be mitigated somewhat by changing P02h take-or-pay assumptions to match over a shorter lifespan.

These savings are theoretical in the sense that the Company is currently unable to produce coal at the Jim Bridger mine without covering its capital, operating, and reclamation costs, or contract coal supplied by a third-party with no contractual obligations of any kind – however, PacifiCorp will continue to evaluate options for Jim Bridger Unit 3 and Jim Bridger Unit 4 as part of its coal supply procurement and in the 2023 IRP.

While these Oregon sensitivity results are instructive as to the need for further evaluation of the long-term operation of Jim Bridger Unit 3 and Jim Bridger Unit 4, they do not account for other factors that could impact ongoing operation of the units. For example, the state of Wyoming has required PacifiCorp to issue a request for proposals (RFP) for the installation of carbon capture technology on Jim Bridger Unit 3 and Jim Bridger Unit 4 for the purpose of controlling carbon emissions from the units assuming they continue to operate on coal. PacifiCorp must issue this RFP in 2022 and after receiving responses, it must evaluate how meeting Wyoming's carbon capture requirements will impact fueling plans for Jim Bridger Unit 3 and Jim Bridger Unit 4.

The theoretical results of the Oregon sensitivity also indicate the need for evaluation of a potential conversion of the units to natural gas-fueled operations. PacifiCorp intends to evaluate a natural gas conversion alternative in subsequent sensitivities and IRPs. Additional alternatives (as recently discussed at the Company's February 25, 2022 public input meeting for the 2023 IRP) may also include conversion to hydrogen, ammonia or bio-fueled operations.

In addition to the possibilities of favorable fuel contracts, many factors including risk are expected to play a role in the economics of Jim Bridger Unit 3 and Jim Bridger Unit 4 operations in the next several years. A few of these risk factors include more recent information on market depth and pricing, increases in system load, the economics of fuel-type conversions, emissions and environmental legislation.

Please refer to Confidential Attachment ALJ Bench Request 1-1, reporting Jim Bridger Unit 3 and Jim Bridger Unit 4 generation assuming no minimum take-or-pay obligations across the LT, MT and ST models as compared to outcomes of the P02-MM study as filed in the 2021 IRP.

(b) Please refer to Confidential Attachment ALJ Bench Request 1-2 which provides fuel costs savings removing Jim Bridger take-or-pay fuel.

(c) PacifiCorp has not calculated a "value of capacity" specific to individual hours in the requested study. However, the greatest resource need typically coincides with the highest energy and operating reserve values, as increasing prices indicate fewer and fewer high-cost resource options are all that remains available. For details on the hourly marginal energy and operating reserve values applicable to resources located at Jim Bridger, please refer to Confidential Attachment ALJ Bench Request 1-3. Note: these values are based on expected conditions in the ST model, and do not account for stochastic variation in load, hydro, or thermal unit availability which would result in significantly higher resource needs in some periods. In general, the periods with the highest marginal energy and operating reserve values in the ST model would be reasonably aligned with the periods in which resource need would be the highest in a stochastic analysis.

(d) Please refer to Confidential Attachment ALJ Bench Request 1-4 which provides the hourly generation and operating reserve provision of Jim Bridger Unit 3 and Jim Bridger Unit 4 in the requested study. To maintain reliable operation and comply with reliability standards, PacifiCorp must serve load and maintain operating reserves. As a result, resources that are providing operating reserves contribute to system reliability even if they are not dispatched to their maximum operating level. In addition, in order to maintain reliability, additional resources must be available to serve load and maintain operating reserves even if load, hydro, or thermal availability change in an adverse manner. PacifiCorp has not performed stochastic analysis of reliability to evaluate the impact of variations in load, hydro, or thermal availability specific to this study, which reflects expected conditions. However, an hourly stochastic reliability analysis was recently conducted in Docket UM 2011 (General Capacity Investigation), based on a portfolio that is similar to that requested and for the years 2024, 2028, 2032, 2036, and 2040. The results of that analysis were provided in that docket, and for convenience, a copy is provided here as Attachment ALJ Bench Request 1-5 and Confidential Attachment ALJ Bench Request 1-6. Note: PacifiCorp has provided an additional summary within Attachment ALJ Bench Request 1-5 highlighting the timing of periods with reliability concerns over time.

In 2024, reliability concerns are highest in the afternoon and evening in July. In 2028, August and September evenings have a higher reliability risk than July, while in 2032 reliability risks continue to shift toward the nighttime in a number of months. In 2036, reliability risks are primarily in the evening and overnight in July through September. In 2040, reliability risks are primarily during winter mornings and evenings. The change between 2036 and 2040 is in part related to the retirement of thermal resources totaling approximately 2,800 megawatts (MW), including two Huntington units, four Bridger units, Wyodak, and Hermiston.

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ALJ Bench Request 6

ALJ Bench Request 6

Analysis Supporting the Assumptions Used in the IRP:

(a) Please address whether inclusion of minimum take levels for the coal plants has increased the forecasted level of market sales in the preferred portfolio. Include a discussion of the assumptions, such as fuel cost, influencing PLEXOS' decisions regarding when and for what purpose to dispatch coal plants before minimum take levels are reached.

(b) Referencing Sierra Club's Confidential Table 3, please detail the analysis performed to arrive at the minimum take levels assumed for Jim Bridger.

(c) Please specifically address the reasons for the changes in the minimum take level at the third-party mine shown in Sierra Club's Confidential Table 3.

Confidential Response to ALJ Bench Request 6

(a) The Jim Bridger fuel assumption modeling included a take-or-pay tier and volumes within this tier have zero incremental fuel cost. Greenhouse gas (GHG) emissions costs continue to apply, so as part of system dispatch the Jim Bridger coal-fired resources would generally be dispatched up whenever the locational marginal price (LMP) exceeded their emissions cost, up to the annual take-or-pay volume. The Jim Bridger take-or-pay modeling thus results in a lower dispatch price for Jim Bridger than it would otherwise have. This results in higher Jim Bridger dispatch offset by a combination of reduced output from other resources, reduced market purchases, and increased market sales, depending on the marginal source of supply (or demand in the case of market sales) in each period. Please refer to the Company's response to ALJ Bench Request 1, specifically Confidential Attachment ALJ Bench Request 1-1, which details market activity in each study. Fuel volume discussion continues in the Company's response to subpart (b) below.

(b) The minimum take levels for the Bridger Coal Company (BCC) are based on the production levels associated with a "1 dragline operation", which represents the lowest level of production at the mine that would likely be economic.

The minimum take levels for Black Butte Coal Company (BBCC) are based on discussions with BBCC regarding various production levels ranging from [redacted] million tons. Because Jim Bridger plant is [redacted] PacifiCorp's 2021 Integrated Resource Plan (IRP) assumes a minimum BBCC production volume of [redacted]

[redacted] million tons each year, which is at the low end of the production volumes identified by BBCC.

Consistent with Idaho Power Company's (IPC) 2019 IRP, PacifiCorp's 2021 IRP assumes IPC participates in the BBCC contract through 2030 and no longer participates in the plant or BBCC contract beginning in 2031. Consistent with the current coal supply agreement (CSA), PacifiCorp's 2021 IRP assumes PacifiCorp takes [redacted] of BBCC's coal production through 2030. Beginning in 2031, the 2021 IRP assumes PacifiCorp takes [redacted] of the assumed minimum BBCC production volume.

(c) Please refer to the Company's response to subpart (b) above.

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ALJ Bench Request 7

Explanation of the Selection of the Preferred Portfolio over a Variant:

(a) Please describe, with specificity, the reasons for the $60 million difference between the portfolios described at page 13 of the Staff Report. Include a discussion of whether market sales contribute to the difference.

(b) Describe the technology or resource type of the next marginal resource the model can select instead of Jim Bridger 3 and 4.

i. Provide the capital, fixed, and variable operating cost and the potential contribution to market sales revenue of the next marginal resource compared to the fixed and variable costs of continuing to run Jim Bridger.

Response to ALJ Bench Request 7

(a) The portfolio changes between "P02h" when Jim Bridger Unit 3 and Jim Bridger Unit 4 are forced to retire before 2030 less "P02-MM" are reported in PacifiCorp's 2021 Integrated Resource Plan (IRP), Volume I, Chapter 9 (Modeling and Portfolio Selection Results), on page 287 and Figure 9.28 (Increase/(Decrease) in Proxy Resources when Jim Bridger Units 3 and 4 are Forced to Retire before 2030). When Jim Bridger Unit 3 retires, 200 megawatts (MW) of solar co-located with storage is added to the portfolio. When Jim Bridger Unit 4 retires, an additional advanced nuclear resource is added in 2030. These additions displace a 2038 advanced nuclear resource and a 2038 non-emitting peaker, which are included in the "P02-MM" portfolio. The supporting confidential work paper for Figure 9.28, including the portfolio difference, is provided on the confidential data disk accompanying the 2021 IRP, specifically folder "Chapters and Appendices CONF\Chapter 9 - Modeling and Portfolio Selection Results", file "CONF Figure 9.28 21IRP 20yr_P02-MM JB-RET (15283) less 21IRP 20yr_P02-MM (5230)".

For the present value of revenue requirements differential (PVVR(d)), please refer to the confidential data disk accompanying the 2021 IRP, specifically folder "Chapters and Appendices CONF\Chapter 9 - Modeling and Portfolio Selection Results", file "CONF Figure 9.29 - P02h - JB3-4 Retire", tab "Summary".

Effectively, the costs to add replacement proxy resources (proxy capital recovery and proxy fixed costs) exceeded the cost to continue operating Jim Bridger Unit 3 and Jim Bridger Unit 4 (coal fuel costs, emissions cost, non-gas variable operations and maintenance (VOM), risk adjustment offset by higher system balancing market sales, other costs, and lower gas fuel cost) for a total of $60 million.

For ease of reference, copies of the above referenced confidential work papers are provided herewith as Confidential Attachment ALJ Bench Request 7-1, and

PacifiCorp's 2021 IRP, Volume I can be accessed by utilizing the following website link:

https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2021-irp/Volume%20I%20-%209.15.2021%20Final.pdf

(b) In the absence of reliability needs, the next marginal resource the model can select at the Bridger brownfield site to replace Jim Bridger Unit 3 and Jim Bridger Unit 4 is Solar+Storage. However, this resource contributes neither adequate capacity, nor duration of energy to meet reliability to wholly replace these two resources during periods with shortfalls. As a result, resources that can provide both higher maximum capacity **AND** long duration of energy during those periods are limited to Non-Emitting Peaker and Nuclear resources.

i Please refer to Attachment ALJ Bench Request 7-2 which provides the annual costs for the non-emitting peaker, nuclear and Solar+Storage resources in the "P02-MM H" variant case. Net resource costs are provided on tab "Generator", in column AJ. These net costs are annualized build costs less revenue net of fixed operations and maintenance (FOM) costs. The revenue in the calculation includes battery revenue, as applicable. Resource values vary by year based on the value of the generation they provide during a given time period.

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CERTIFICATE OF SERVICE

I certify that I filed a true and correct copy of PacifiCorp's **Responses to Bench Requests 1, 6, and 7** on the parties listed below via electronic mail and/or overnight delivery in compliance with OAR 860-001-0180.

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LC 77

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Dated March 3, 2022.

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Coordinator, Regulatory Operations